MARCH 18, 1954

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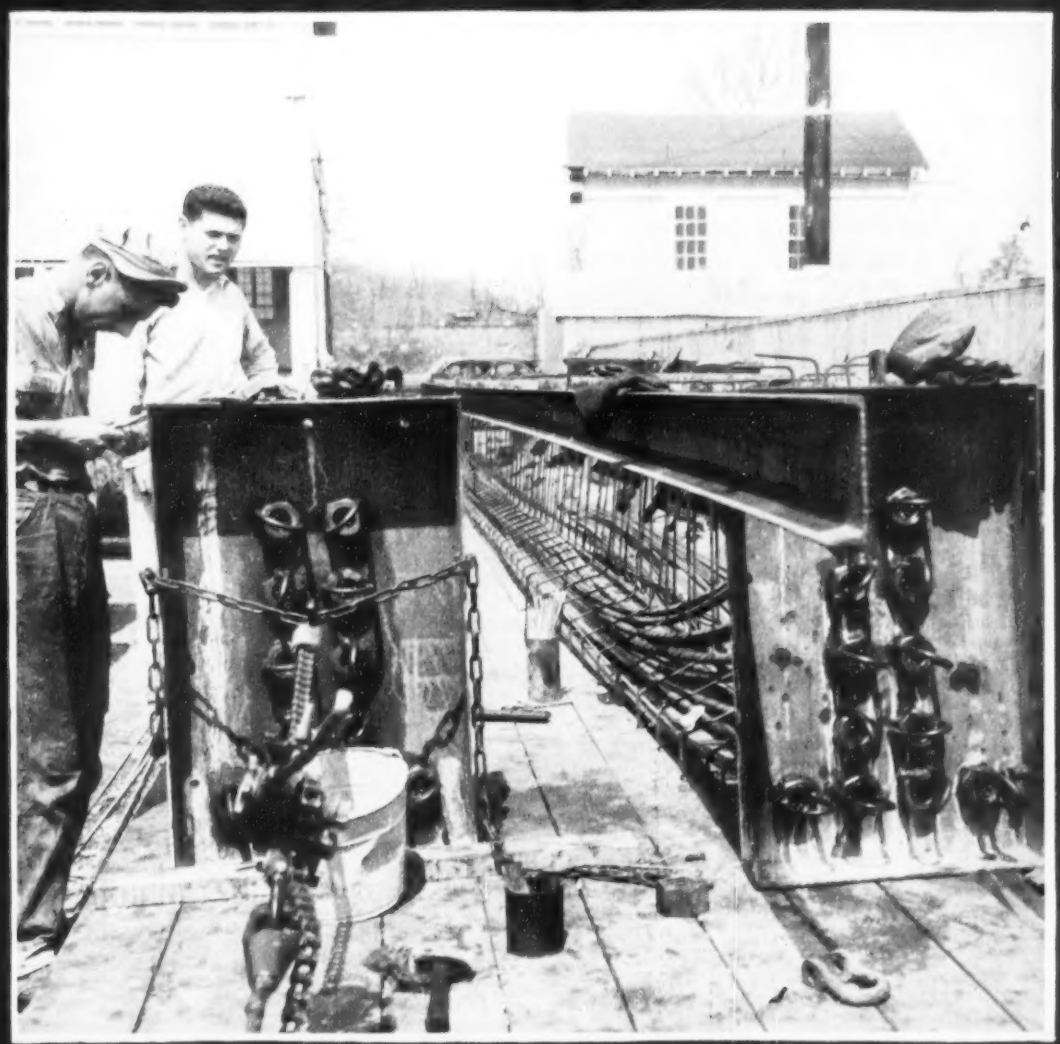

★ Catching cooler cooling water

★ Pitfalls in flat-plate construction

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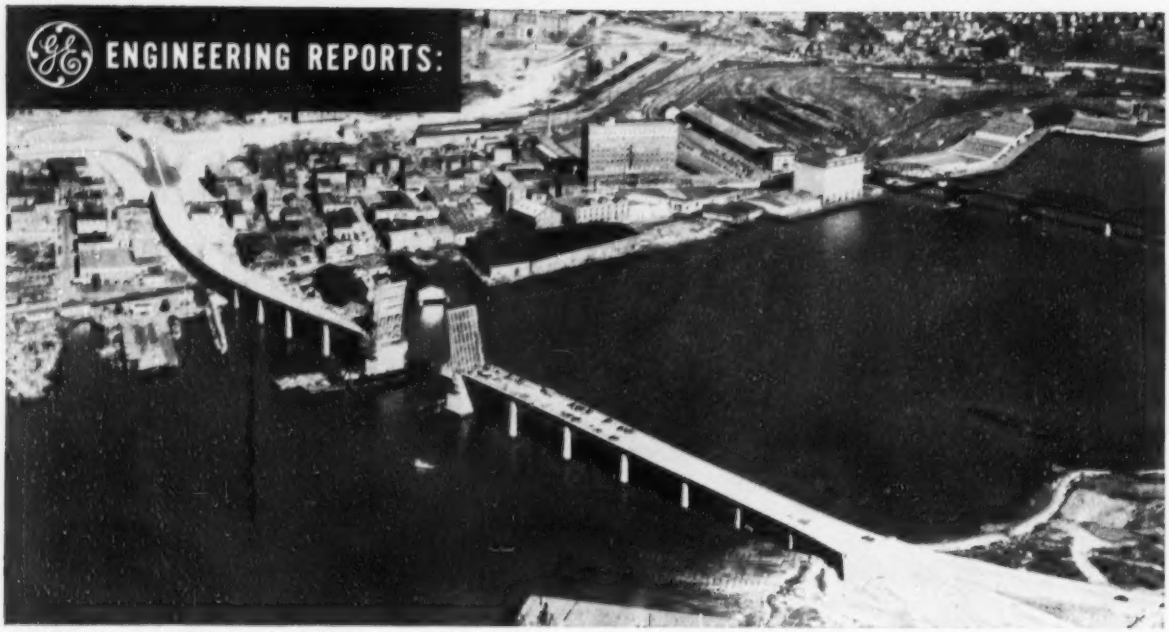


MOTORISTS SAVE 10 TO 30 MINUTES crossing from Norfolk to Portsmouth via the new G-E equipped bridge and tunnel. Bridge is 4-lane, 2135 ft between abutments. Bascule span is of the double-leaf, rolling-lift type with leaves each 90 ft long.

Bridge's drive system helps speed 29,000 cars per day

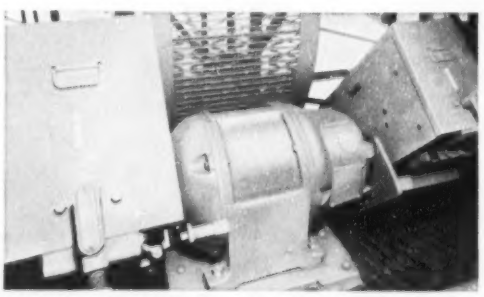
G-E equipment at Portsmouth - Norfolk Bridge gives fast movement, positive control of leaves

The new 4-lane bascule bridge across the Elizabeth River at Norfolk, Va.—part of a combined bridge and tunnel project built for the Portsmouth–Norfolk Bridge Tunnel Commission—is currently handling over 29,000 vehicles per day. Ability to handle this heavy traffic flow is due in part to electric equipment supplied and co-ordinated by General Electric.

In helping to develop the bridge's drive system, G-E engineers worked closely with J. E. Greiner Co., consulting engineers, Tidewater Construction Corp., engineers and contractors, and Tuck and Kendall Inc., electrical contractor. Result of this co-operation: a simple, dependable drive system that expedites traffic because it is easy to operate and provides positive-action control of bridge leaves for fast movement and smooth, safe seating.

This is one more example of how G-E engineers can help your engineers or consultants on electric equipment for heavy construction projects. For other examples of how G-E application engineering has been utilized on many of the important bridge "firsts" throughout the country, contact your local G-E Apparatus Sales Representative or write for a copy of GED-1982. General Electric Co., Schenectady 5, New York. 664-26

POSITIVE-ACTION CONTROL of span motors is centered in this G-E operator's desk. Fine-scale selsyn dial pinpoints position of each leaf during seating.



EACH LEAF IS MOVED by 2 G-E 25-hp motors (one shown). G-E motor control center, operated from desk, controls these and tail locks, gates, barriers.

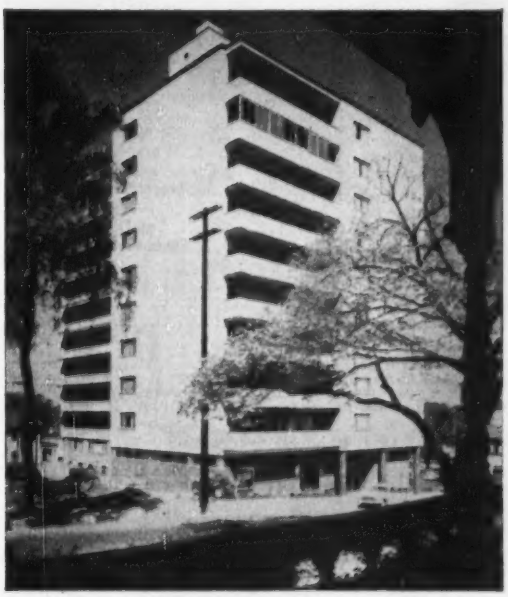
Engineered Electrical Systems for Heavy Construction

GENERAL ELECTRIC

RECENT CONSTRUCTION WITH STRUCTURAL STEEL

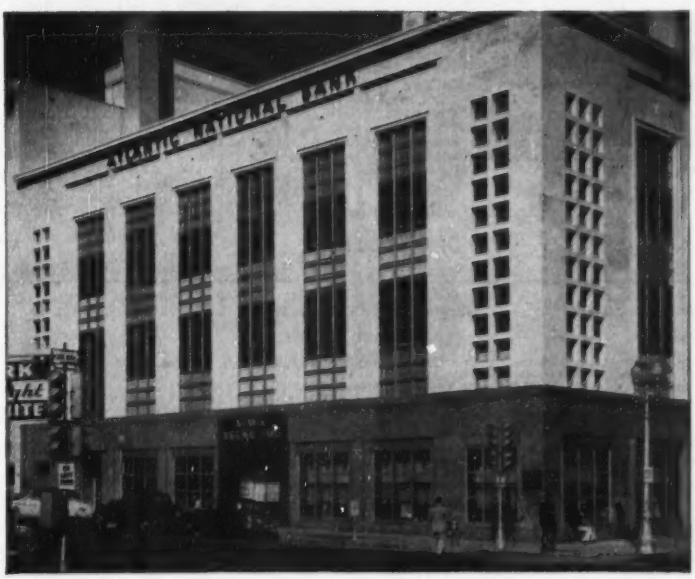
Office Building in New York

This fourteen-story structure, the Central Office Building of the New York City Transit System, is part of the growing Brooklyn Civic Center. It is adjacent to the three subway divisions of the Transit System, and has a sub-basement five stories deep. The steel framework was built of Bethlehem Structural Shapes. *Architect:* Andrew J. Thomas; *General Contractor:* Grove, Shepherd, Wilson & Kruge, Inc.; *Steel Fabricator and Erector:* Harris Structural Steel Co. — all of New York.



Apartment Structure in Alabama

Bethlehem Structural Shapes were used in constructing the Walter Bragg Smith Apartments, Montgomery, Ala. The twelve-story building, containing 122 apartments, was planned primarily for business men and women. *Architects and Engineers:* Sherlock, Smith & Adams, Montgomery; *General Contractor:* Bear Brothers, Inc., Montgomery; *Steel Fabricator and Erector:* Decatur Iron and Steel Co., Decatur, Ala.



Bank Building in Florida

This is the building of the Atlantic National Bank of Jacksonville, Jacksonville, Fla. Its four stories are faced with grey granite and white marble, and are supported by a framework of Bethlehem Structural Shapes. *Architects and Engineers:* Bank Building & Equipment Corp. of America, St. Louis; *Structural Engineers:* R. L. Eason & Associates, St. Louis; *General Contractor:* The George D. Auchter Co., Jacksonville; *Steel Fabricator and Erector:* Aetna Steel Co., Jacksonville.

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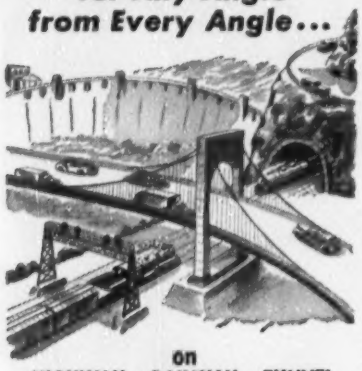

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Publisher

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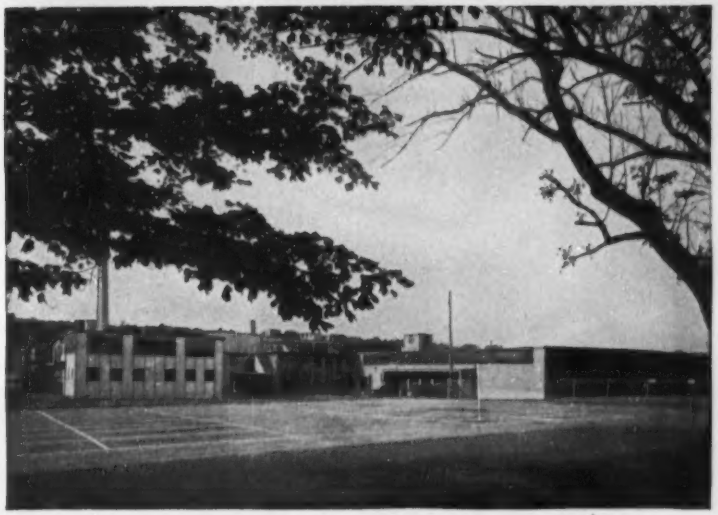
Height of the fire

at two chemical plants



One plant is a seething inferno. Several were injured in this $600,000 mid-western chemical fire.

How different the story at the other chemical plant. When fire broke out at Arnold Hoffman & Company, Inc., Dighton, Mass., there was no rapid spread of flames. No one was injured. The blaze was confined to a single area of the plant and the damage was negligible.

What did the Arnold Hoffman plant have which the other chemical plant did not have? The protection of a Grinnell Automatic Sprinkler System!

There is a Grinnell Fire Protection System for every fire hazard. These systems provide for the effective control of fire — *at its source.*

Remember, a Grinnell System often pays for itself in a few years through reductions in insurance premiums. So if you have fire insurance, you are probably paying for Grinnell Protection anyway . . . *why not have it!*

A Grinnell engineer will gladly advise you on the proper Grinnell System to protect *your* property. Write Grinnell Company, Inc., 258 West Exchange Street, Providence, Rhode Island.

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- ***ProtectoSpray System.*** For fires in light and medium oils — many special hazards.
- ***ProtectoFoam System.*** For fires in gasoline and other highly flammable liquids.
- ***FlameBuster Portable Hose Nozzle.*** For oil fires — also for class A fires.

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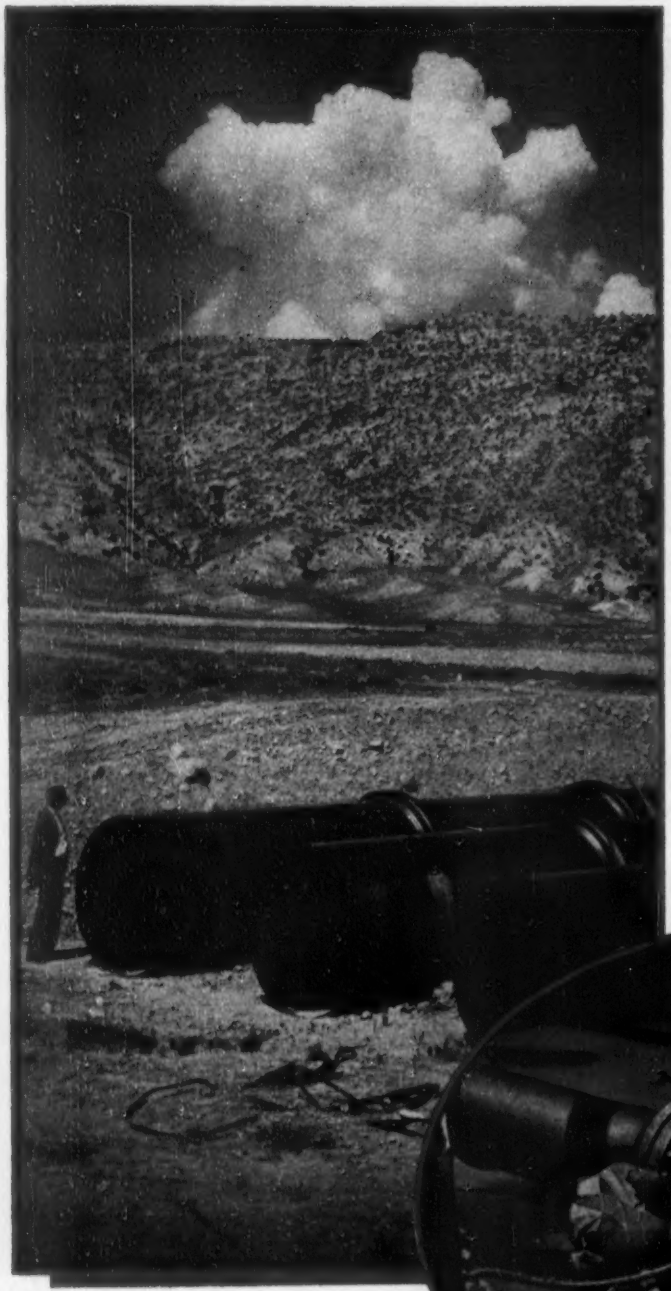
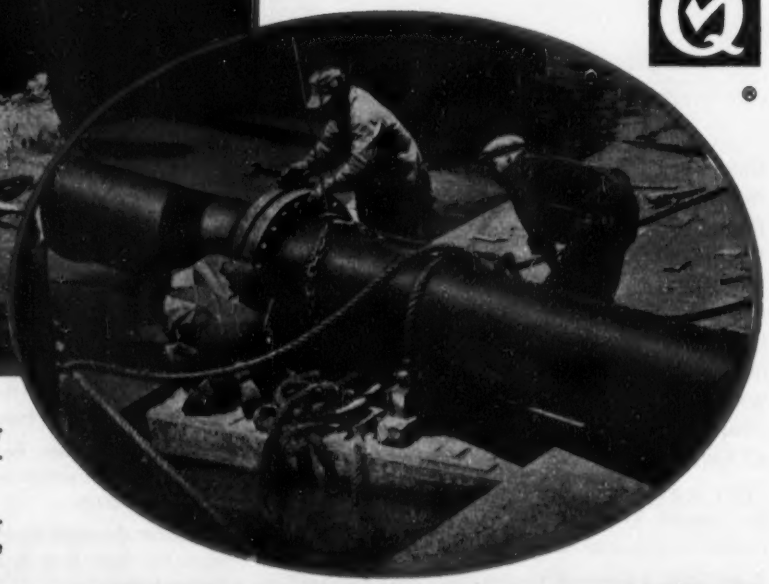
PROTECTION AGAINST EVERY FIRE HAZARD

Manufacturing, Engineering, and Installation of Automatic Sprinklers Since 1878



Versatile-

You know, of course, that cast iron pipe is widely used for water and gas mains, pressure sewers and outfalls, and almost exclusively in water filtration and sewage treatment plants. It is not so well known that this versatile pipe is also rendering yeoman service to Industry in keeping down maintenance cost in many applications. Such industries, for example, as chemical, paper, rayon and other process industries; coal mines and oil refineries; railroads and steel plants. Where effective resistance to corrosion is mandatory for long life and economy, specify cast iron pipe. For information write: Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 122 So. Michigan Avenue, Chicago 3, Ill.

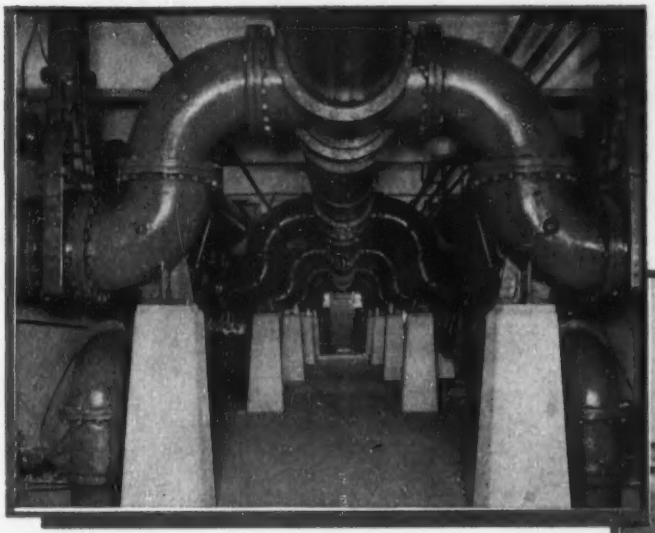


1800 feet of 36" to 60" cast iron pipe for culvert in connection with relocation of railroad tracks in Wyoming

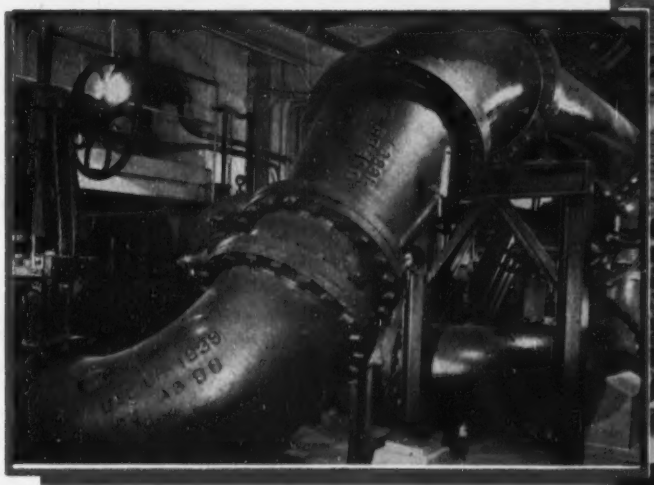
(At right) A river-crossing cast iron water line near Chester, Pa., showing flexible joint assembly.

CAST IRON PIPE

is the word for CAST IRON PIPE



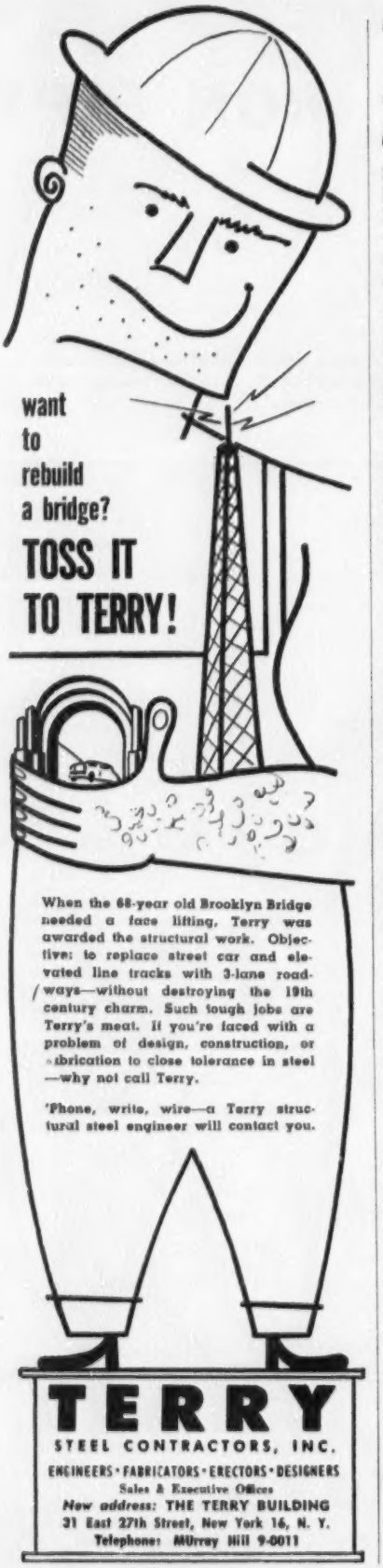
Cast iron pipe and fittings installed in gallery of water filtration plant in Muskegon, Michigan.



Installation of cast iron pipe and fittings in steam plant of a gas and electric utility in California.

Submarine installation of cast iron flexible joint pipe for outfall sewer into Long Island Sound at Fairfield, Conn.

SERVES FOR CENTURIES...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READER COMMENT

Measuring highway investment

SIR: Many of the people who travel highways for pleasure, and a little business, would like to have all highways built to freeway standards even though the roads are traveled at about one-fourth of their design capacity. However, highway taxes would need to be four or five times the present rates if the states were to improve all roads to such freeway standards. Obviously, such highway users are not looking at the highway improvement problem as the management of big business does as to its investments in new plant. Such managements rate the soundness of their investments upon the sum invested per unit of goods produced, especially when they compare one plant with another.

Perhaps we could learn something about our investment in highway plant if we computed the investment in terms of units such as "100,000 vehicle-miles of travel per year." Knowing the actual or expected cost of a mile of highway and the number of vehicles which will use this mile of highway, the amount invested per 100,000 vehicle-miles of travel per year can be computed.

A moderately traveled two-lane highway, costing perhaps $150,000 per mile, will produce about ten units of 100,000 vehicle-miles of travel per year per mile. Thus this modern, two-lane road calls for an investment of $15,000 for each unit of travel per year.

A multilane expressway facility in an urban area such as Cleveland will carry a very high volume of traffic and each mile may produce 35 of these units of travel per year. If this expressway costs $1,000,000 a mile, the investment per unit of travel per year is about $30,000.

The Ohio toll road now under construction represents an investment of about $35,000 for every expected unit of travel per year. A toll road proposed for Indiana appears to call for an investment of nearly $40,000.

A new two-lane highway in Maryland's program projected to be built during the next four years was estimated to cost $107,000 per mile. During the first ten years of its operation the anticipated traffic using each mile will generate, on the average, about 350,000 vehicle-miles of travel per year. The highway users of Maryland will invest $30,000 for each unit of travel produced per year.

Another new, dual, four-lane highway in Maryland which contemplates full control of all access and which is also projected to be built during the next four years, was estimated to cost $1,000,000 per mile, including the cost for grade separation bridges and for purchasing the right-of-access. During the first ten years of its operation the anticipated traffic using each mile will generate, on the average, about 59 units of travel per year. Each mile of this urban expressway will represent an investment of about $17,000 for each unit of travel produced per year.

Still another, and perhaps more nearly average, new dual highway in Maryland included in the first four-year program, was estimated to cost $750,000 per mile. During the first ten years of its operation, the estimated traffic will produce only about 22 units of travel per year. This proposed new highway represents an investment of about $34,000 for each unit of travel per year.

These few random examples suggest that some investments in highway improvements may not be as good as others. Sound judgment and good sense in the spending of the very limited highway funds during the next ten years call for the investment of the highway dollars in those projects which show the smallest cost per vehicle-mile of travel. However, one cannot ignore the fact that some unprofitable highways are required for the same reason that large industries produce some products which, when considered alone, are not profit producing.

GEORGE B. SOWERS
Consulting Engineer
Cleveland, Ohio

Landslide data requested

SIR: The Landslide Investigation Committee of the Highway Research Board requests help in compiling a volume on "Landslides and Engineering Practice."

This volume is being prepared primarily for highway and railroad engineers, but it is hoped that it will be useful to engineers and geologists whose work concerns landslides.

A questionnaire covering all phases of the subject—from economics to prevention and correction of slides—is being sent to highway departments and interested groups.

The committee would like additional facts from engineers and geologists, whether they have data on one or many slides, and whether their information is general or specific.

(*Continued on page 10*)

B.F.Goodrich

Super Traction tires pull through mud to help build a highway

THIS tractor scraper is at work on U.S. Highway 190 near Livonia, La. It is one of the units of W. R. Aldrich & Co., a Baton Rouge firm specializing in heavy construction projects. Plowing through the area's heavy, muddy soil under 20-ton loads could easily cause the scraper to bog down, tie up production, waste valuable time.

But the company avoids this trouble, uses B. F. Goodrich Super Traction tires —tires built to pull through such rough going faster, easier.

Thick, widely-spaced Super Traction cleats take a deep bite. Yet the entire tread contacts the soil, makes a big footprint for plenty of flotation. This B. F. Goodrich tire pulls without sinking, keeps you on top of the soil and on schedule.

Specially-compounded rubber in the Super Traction sidewall guards against cuts, resists cracking. And the patented B. F. Goodrich nylon shock shield protects the tire body from bruises.

Layers of strong nylon cords under the tread stretch together under impact to absorb and distribute shocks. You gain 4 ways: more hours of service, more recappable tires and longer service per recap, increased bruise resistance and less danger of tread separation. All these advantages, yet the nylon shock shield costs you nothing extra.

The Super Traction is just one of the complete B. F. Goodrich line of tires for every type of off-the-road service. See your B. F. Goodrich retailer. His address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Div., Akron 18, Ohio.*

Specify B. F. Goodrich tires when ordering new equipment

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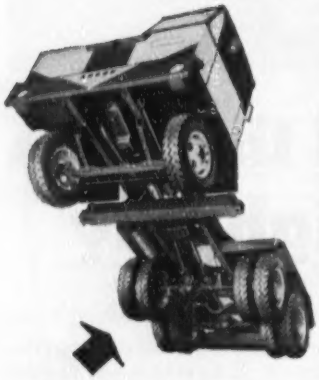

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Don't let the low price fool you! Sure, we are talking price . . . *because the new "MC-104" is the lowest priced Moto-Crane you can buy.* But no other crane on rubber approaches the design quality and performance of this new Lorain "baby". Look what you get in this "bargain in quality":

A new 45 m.p.h. Moto-Crane Carrier—An entirely new design developed exclusively as a shovel-crane mounting. Powered by a Ford engine, with 8 forward speeds and 2 reverse speeds, its "6x4" drive delivers power to both rear axles. Ten big 9:00x20 tires provide soft-ground flotation and Equalizer Rocker Beams provide constant ground contact and tractive effort for off-the-road travel. There's a sturdy, all-welded frame, with 15" deep side members, to provide a solid base. Mounted on this sturdy carrier is a turntable design that has "borrowed" many of the time and field-proved Lorain "TL" big machine features. The clutch shaft alone contains 18 anti-friction bearings. The convenient "Packaged Component" design permits quick changing of Hoist Shaft, Clutch Shaft and Engine in complete units. 5 interchangeable booms, matched to "MC-104" design, complete this low-priced, quality package.

Want proof? Phone your nearby Thew-Lorain Distributor. Ask him to demonstrate the "MC-104". He'll show you why . . . you get more in the "104".

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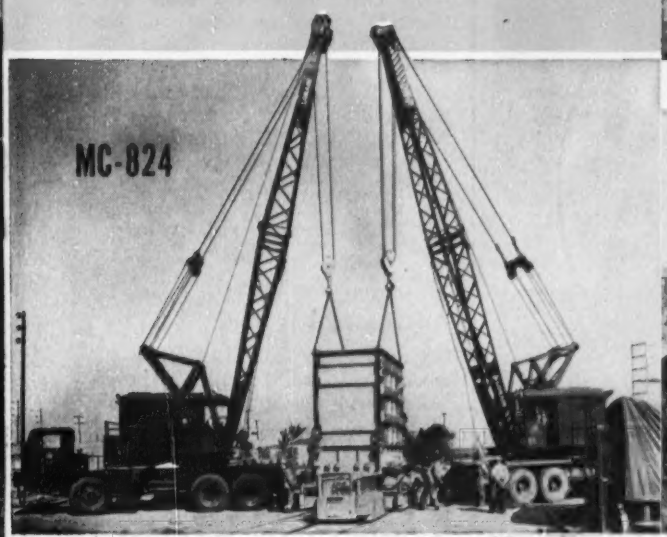

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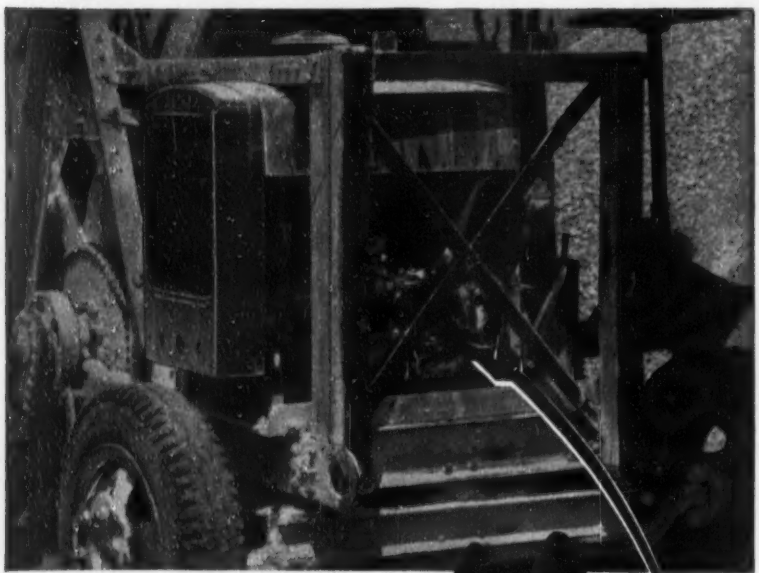

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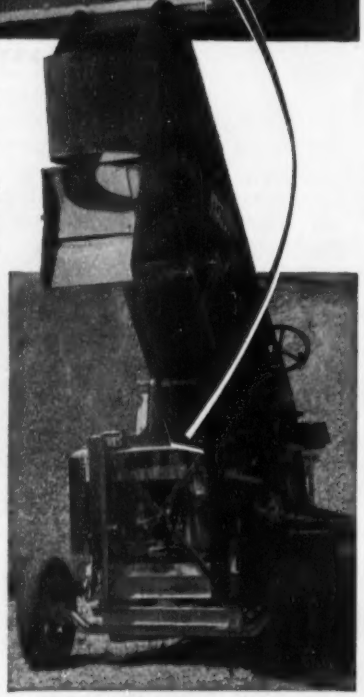

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READER COMMENT

Requests for copies of the questionnaire or for further information should be addressed to: Seward E. Horner, chief geologist, State Highway Commission of Kansas, Topeka, Kan.

EDWIN B. ECKEL
Chairman,
Landslide Investigation Committee
Denver Federal Center,
Denver, Colo.

Building airbases abroad

SIR: I have read the excellent article on the Spanish air and naval bases which appeared in the Dec. 31, 1953, issue of ENGINEERING NEWS-RECORD.

While I do not question the accuracy of statements and quotations, I wish to point out that the article has lent itself to considerable misinterpretation as to the contractual and command relationships between the Corps of Engineers, the contractor, and the Air Force in North Africa.

Actually the relationship between the Corps of Engineers and the Air Force in North Africa is essentially the same as on any other Air Force construction project of the corps or any other Department of Defense construction agency in Greenland, Iceland, Labrador, Arabia or Europe.

In all fairness to the Air Force, I must state that at no time could the relationship between the corps and the Air Force in North Africa be interpreted as having been the cause of a major construction difficulty.

S. D. STURGIS, JR.
Major General
Chief of Engineers
U. S. Army

Any council is shaky

SIR: Your editorial "Less unity for engineers" (Dec. 10, p. 172) overlooks one important part of this whole situation.

As far as the national picture is concerned, the editorial is pretty sound. At the same time, I should like to point out that any council (not just Engineers' Joint Council) has an existence that is shaky to say the least. It is subject to the whims of a few who may withdraw their support and let the council fall on its face.

I am firmly convinced that, if engineers want a permanent, strong organization, it will have to be based on the individual engineer, not on any coalition of societies. History bears this out.

Too many persons on the boards of national and state societies (including those in the National Society of Professional Engineers as well as those

(*Continued on page 14*)

NEW URM WAGON DRILL WITH HYDRAULIC LIFT

does these things...

Spots holes faster than ever before.
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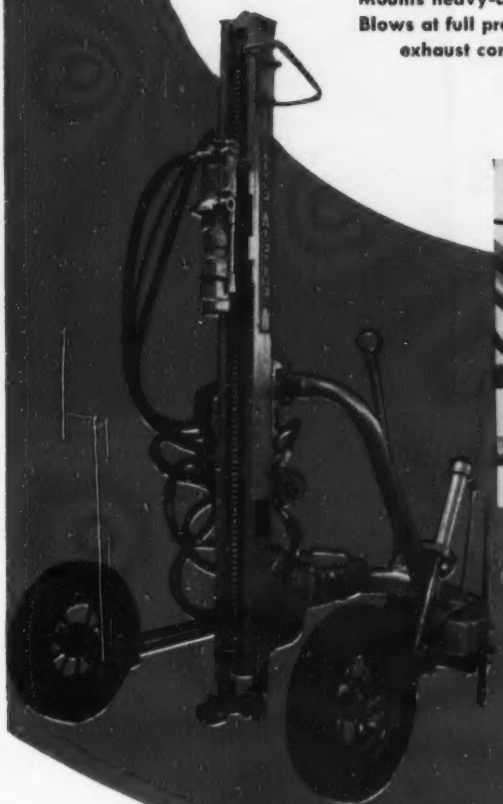

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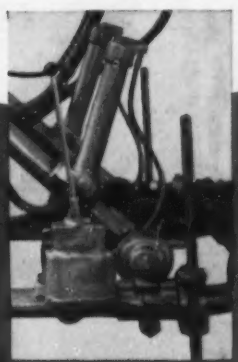

The new URM Wagon with hydraulic lift is rugged and simple —special feature incorporates hydraulic cylinders on both sides of wagon frame to lift U-bar.

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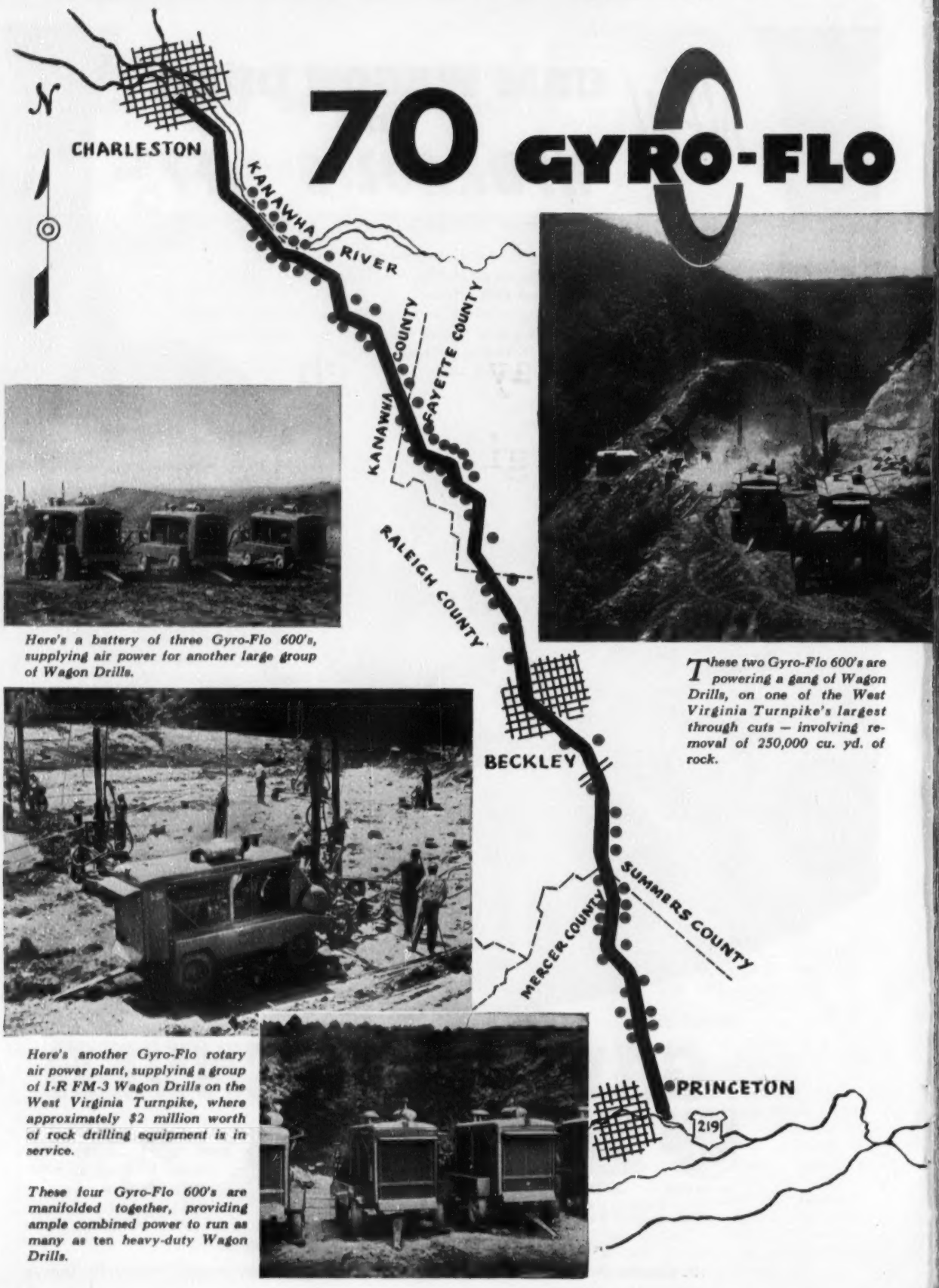
70 GYRO-FLO



Here's a battery of three Gyro-Flo 600's, supplying air power for another large group of Wagon Drills.

These two Gyro-Flo 600's are powering a gang of Wagon Drills, on one of the West Virginia Turnpike's largest through cuts — involving removal of 250,000 cu. yd. of rock.

Here's another Gyro-Flo rotary air power plant, supplying a group of I-R FM-3 Wagon Drills on the West Virginia Turnpike, where approximately $2 million worth of rock drilling equipment is in service.

These four Gyro-Flo 600's are manifolded together, providing ample combined power to run as many as ten heavy-duty Wagon Drills.

COMPRESSORS

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Every red dot on this map of the West Virginia Turnpike represents an Ingersoll-Rand Gyro-Flo Compressor. Added together, they have a combined capacity of 38,880 cubic feet of air per minute. That's a mighty large share of the air power required for this huge drilling and blasting job.

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Now available in 125, 210, 315 and 600 cfm sizes, there's a Gyro-Flo portable that's *right* for practically any construction job. Why not take advantage of their improved performance on *your* next drilling project. Your nearest I-R distributor or branch office will be glad to give you complete information on all sizes. Call him today —or write to Ingersoll-Rand for your copy of Bulletin No. 2321.

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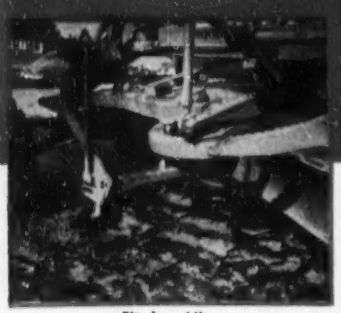

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READER COMMENT

now in EJC) get the idea that they and their board are all-important.

The important unit in a real professional society is the local or county one. Look at the medical associations and bar associations and you will find that this is true. The American Medical Association and American Bar Association make a big noise sometimes, but they get kicked in the teeth if they are not in line with the thinking of county and state bodies.

The professional society is needed most in my town and your town. It is needed less state-wide and even less nation-wide. It must have a voice before state and national legislatures, but the real building of a profession and its responsibility begin at home. A profession is made up of individuals.

If NSPE holds out hope only for a national voice, certainly it cannot do the job at present as well as EJC. I do believe, however, that there are a lot of people in NSPE who realize the importance of the local chapter, whereas I don't think any of the advocates of EJC subscribe to this idea at all.

ELGIN B. ROBERTSON
Dallas, Tex.

CALENDAR

American Congress on Surveying and Mapping, annual meeting and exhibit, Hotel Shoreham, Washington, D. C., March 22-24.

Rail Steel Bar Association, annual meeting, Jung Hotel, New Orleans, La., March 24-26.

American Power Conference, annual meeting, Sherman Hotel, Chicago, Ill., March 24-26.

Kansas Highway Engineering Conference, Kansas State College, Manhattan, Kan., March 25-26.

Ohio Society of Professional Engineers, Mayflower Hotel, Akron, Ohio, March 25-27.

Southeastern section AWWA, Poinsett Hotel, Greenville, S. C., March 29-31.

American Institute of Timber Construction, annual meeting, Jung Hotel, New Orleans, La., March 29-April 3.

6th annual highway short course, South Dakota State College, State College, S. D., April 7-9.

Second International Congress on Irrigation and Drainage, Algiers, Algeria, April 12-17.

American Institute of Steel Construction, national engineering conference, Hotel Schroder, Milwaukee, Wis., April 13-14.

Society for Experimental Stress Analysis, Netherlands Plaza Hotel, Cincinnati, Ohio, April 14-16.

Annual Road School, April 19-22; and Conference on Road and Street Traffic Control, April 22-23, Purdue University, Lafayette, Ind.

Conference on instrumentation in water, sewage and industrial waste treatment, Manhattan College, New York City, April 20.

Southern Industrial Wastes Conference, Hotel Shamrock, Houston, Tex., April 21-23.

American Society of Civil Engineers, Pacific Northwest Conference, Davenport Hotel, Spokane, Wash., April 23-24.

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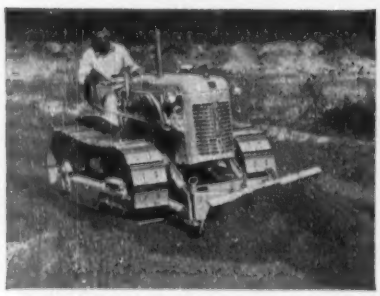

This hydraulic angling blade is a great time saver. It angles to either side by hydraulic control from the tractor seat. Other blade attachments include—stationary angling blade, manually controlled angling blade, snow plow and hydraulic tilt blade.

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When it comes to figuring ways to cut costs and speed work, the Oliver "OC-3" tractor-dozer has all the angles. Why? Well, for one thing it's compact and turns on a dime. You get into places you can't reach with a larger machine...do many jobs formerly done by hand.

You have a choice of blades and a front-end loader for all types of work. Another thing, finger-tip hydraulic control gives you the down pressure and accurate adjustment you need to do a fast, clean job. And, you get the power and traction to work in any weather, any ground condition.

Here's another angle that's worth figuring—takes only a light trailer or truck to move the "OC-3" tractor-dozer from job to job. The fast, easy transport of this unit puts you in line for more work at distant points. Why not check this rugged, economical team for your work? A call or visit to your Oliver Industrial Distributor will put the tractor-dozer on your site for a demonstration.

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THE CONSTRUCTION WEEK

THIRD LINCOLN TUBE STOPPED—The bitter war being conducted for months by tiny Weehawken, N. J., against the mammoth Port of New York Authority exploded unexpectedly this week when the New Jersey Supreme Court ordered PNYA to stop work on its $90-million third tube to the Lincoln Tunnel. The fight, which stems from Weehawken's objection to losing further land to tunnel facilities, was carried to the court on the ground that PNYA should have obtained consent of the New Jersey legislature to start. The court upheld that point.

MANPOWER: HOW TO USE—The way to make the most of the nation's scientific and professional manpower resources, said the National Manpower Commission in a 200-page book, is this:

(1) Transfer job functions downward, to give senior professionals more time; (2) make a great investment in physical and financial resources, to permit higher use of men; (3) give greater and more effective incentives to diminish turnover, prevent waste of training; (4) develop new work patterns, through changes in relationship of supporting semi-professional people to professionals; (5) reassess training in the light of the way professional people work; (6) improve leadership and administration.

ORGANIZATION TROUBLES—There's some doubt permissible over how much importance to attach to that state turnpike authorities organization reported put together at Chicago a week ago under the leadership of Evan Howell, Illinois Turnpike Authority chairman.

Although officials of other turnpike authorities along the route of the proposed Gulf-Lakes turnpike meeting at Miami, thought some organization would be a good thing, they indicated they wouldn't be much interested in joining Judge Howell's group. Their reasoning: They believe the Howell group draws its support from contractors, oil companies, others interested in turnpikes as a business proposition, and they don't think official state authorities should affiliate with such backers.

AIR ACADEMY SITE?—If you'd like to take a flier on where the U. S. will build its $126-$150-million air academy, you might follow the thinking of some Washington newshawks, who are eying Madison (pop. 6,000), county seat of Jefferson County, Indiana.

Thinking goes like this: The Academy might not need extensive flying facilities—if its principle function is training administrators and engineers. And the map indicates Madison is less than 100 airline miles from Air Materiel Command's big Wright-Patterson base at Dayton.

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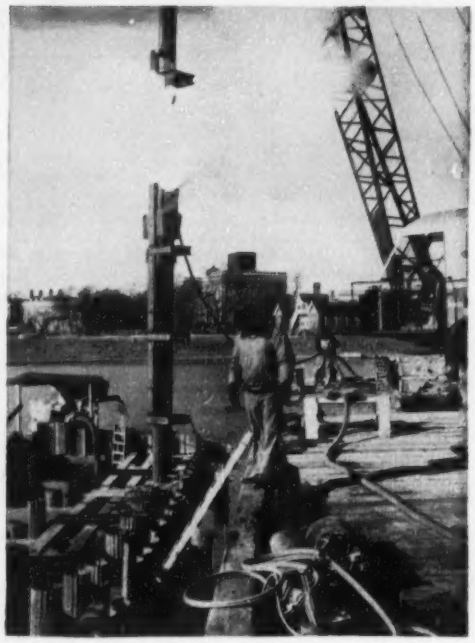
for all types of structures



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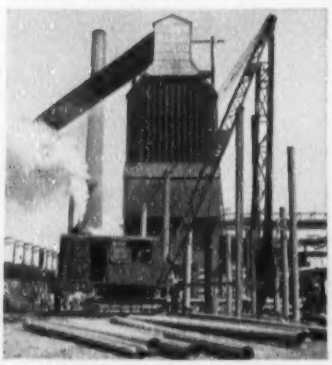

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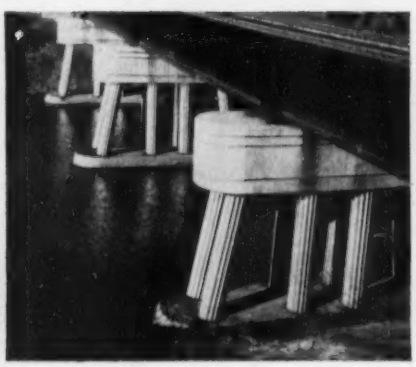
BUILDINGS

BRIDGES

PIERS



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EXPRESSWAY OVERPASSES

UNION METAL

Monotube Foundation Piles for every foundation problem

WASHINGTON OBSERVER

Businessmen plan another big year of spending on new plant expansion. Brushing past all the questions about whether or not we are in for a recession, company officials told the Securities and Exchange Commission that they plan to spend a total of $27.2 billion in 1954. This is down only slightly from the $28.5 billion spent last year—the greatest on record—and $700 million above the 1952 figure.

Business spending might soften somewhat toward the end of the year if business management follows through on plans as of February. Actually the pattern is for companies to revise their expansion plans upward as the year goes along. The tax revision bill now going through Congress might help, too, if it gets past in its present form.

If things go this way, 1954 could be as good as or even better than 1953.

•

Construction legislation is beginning to move through the congressional mill. While no really big bills have yet gone to the White House, a quick run-down shows that the construction measures are well on the way.

The Army Civil Functions Bill is getting the usual treatment. The House committee trimmed the engineers' request for construction by about 10%—but it's expected that this money will be largely restored by the Senate. (See page 28.)

The big highway bill authorizing $800 million federal funds per year for aid to states went through the House like a breeze. The Senate Public Works Committee already has held its hearings, and will be no obstacle to early approval of the bill by the Senate.

Continuation of the 2-cent gasoline tax was voted by the House last week as it passed the Republican-backed Excise Tax Bill. Basically, the bill continues the post-Korean increases—but brings down to 10% some exise rates that are now fixed at 15% or higher. The political pressure is on, though—and despite Eisenhower's Monday speech, odds favor further reductions in the Senate. The bill continues for one year present rates on trucks, autos and parts.

The new Eisenhower hospital construction bill also got House approval last week. That's the one that authorizes an additional $60 million per year for the construction of "long-term care facilities" for convalescents and the chronically ill. This is a sure thing on the Senate side, by all indications.

•

Administration's housing bill, though, is running into some trouble. Hearings are going on in both the House and Senate Banking and Currency committees—and will continue for some time yet. The arguments are about what you would expect:

Labor and Democrats say the public housing features aren't good enough. They want a bigger stepup in the present low-rent government-subsidized public housing.

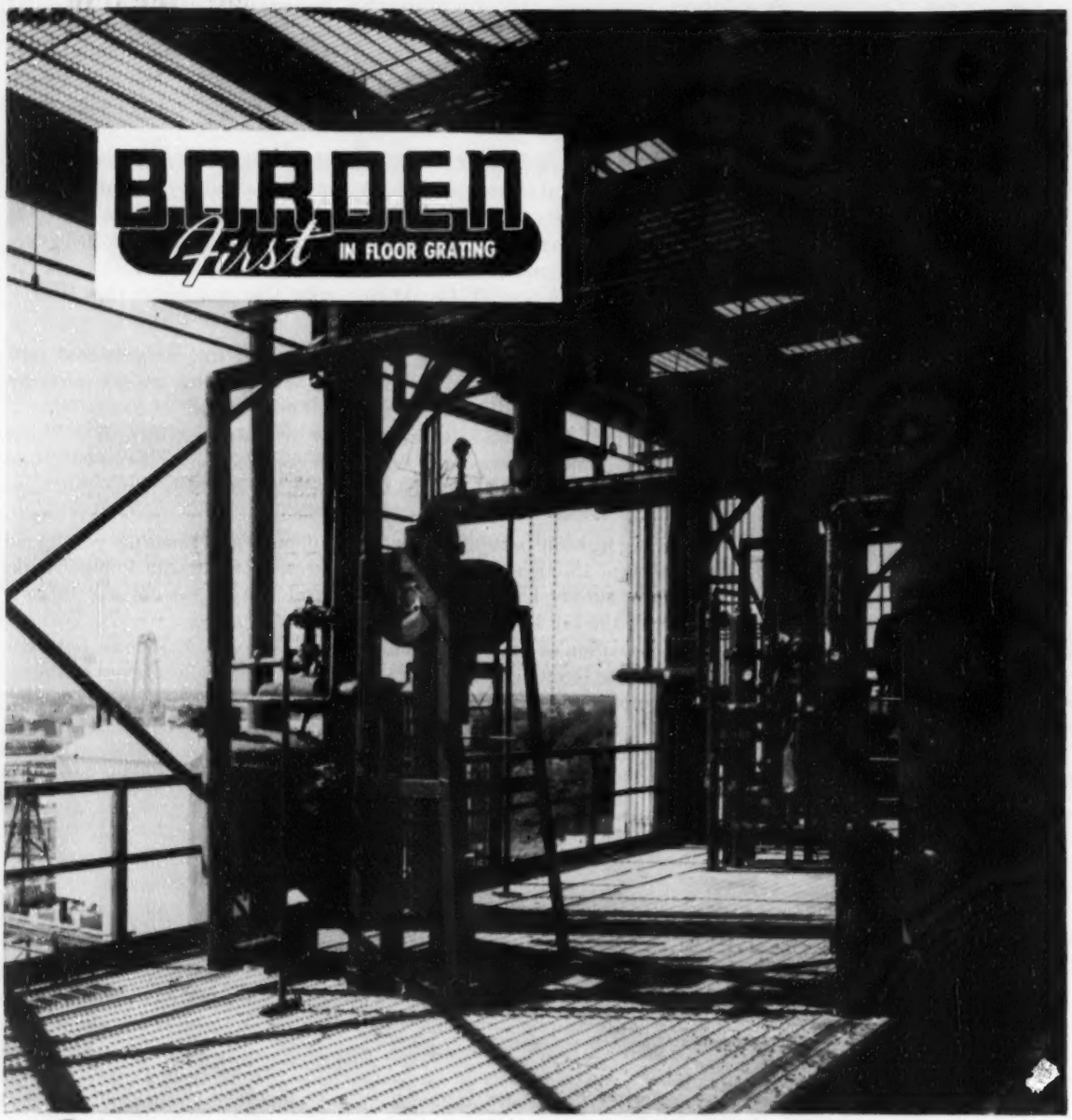
Bankers attack proposal for government-insured 40-year mortgages on no-down-payment, low-cost housing. They say money won't be lent on such terms.

Builders want government-backed secondary mortgage market like the one they have had all along. They fear that creation of a new corporation to buy up mortgages might lose them their secondary market at a time when the need for one is critical.

It's likely to be June before any bill gets out of Congress.

•

Supreme court decision on Niagara-Mohawk power case snarls Niagara power legislation further. High court said that states as well as the Federal Power Commission have jurisdiction over power development in navigable streams. This seems to give New York State a decided edge in its drive to build and own the $360-million project at Niagara. Private companies now need a new amendment to their bill that passed the House.



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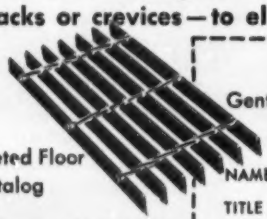

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Photo by Nano

Engineer unions: old story, new try

There is nothing new about an attempt to unionize civil and other professional engineering employes. Movements to this end started shortly after World War I, and have waxed and waned, generally, in direct relation to the U. S. economic health.

But with every such attempt at organization has come a debate, one of serious proportions to engineers—whether they are already in practice, or whether they are studying hard for their degrees as are the young men in the photograph above. The debate is almost as important to every other segment of construction, too.

For the key point is the professional integrity of engineers, and whether that integrity is threatened by affiliation with an organization such as a labor union that will speak for them, bargain wages for them, interpose itself between them and their employers.

Generally speaking, the professional societies have opposed unionization, although occasionally they have taken steps to aid organization on a non-labor union basis (as after passage of the Wagner Act when a need appeared for some organization to keep engineers from being absorbed by bargaining groups in which they would have little voice).

There are many more questions, of course. Some of them are extremely complicated—and all of them stem in some way from the question of professional integrity.

And this week, two events occurred that brought the problem sharply into focus:

In Washington, two men appeared before the Washington section of the American Society of Civil Engineers to debate the problem of unionization. They were E. L. Chandler, assistant secretary of ASCE; and Joseph Amann, president of the Engineers and Scientists of America—an organization representing chiefly engineers employed by the airplane industries, but which also has absorbed at least one of the bargaining groups originally sponsored by ASCE.

And in Cleveland, an American Federation of Labor building trades union—the operating engineers—has already taken into its ranks a number of sub-professionals working on the Ohio Turnpike. And the non-professional leadership of that union was threatening a strike, unless contractors and engineers recognize the union as bargaining agent for these "engineering" employes.

The debate in itself is important, and the action in Ohio gives it the timeliness of news. What follows on the next several pages is a report by Engineering News-Record's staff that may throw the question into focus for the construction industry.

Union vs. ASCE

Debate on engineers union questions professionalism and a management future

The long-standing controversy over whether professional engineers should join labor unions broke into the open again last week. A cross section of some 150 members of the civil engineering profession fired questions about unionization at E. L. Chandler, of the American Society of Civil Engineers, and Joseph Amann of the Engineers and Scientists of America.

The engineers wanted to know:

Are labor unions the answer for the engineer who believes his advancement both through higher salaries and growing responsibilities should be maintained or increased?

Will these organizations damage his prestige as a professional man—both with his fellow engineers and his company?

• **Questioners develop issue**—In the preliminary round, Amann and Chandler outlined their positions and then stepped back for the onslaught of questions. These queries popped up quickly:

What about compulsory unionism? Do you think engineers should strike? How can a union man represent me better with the boss than I can do for myself? The general pattern of questions revealed a groping for the most elemental and fundamental aspects of unionism. The major concern was whether joining a union would be degrading to their stature as professional engineers.

When the air cleared, and the answers were in, the questioners faced the choice of deciding for themselves whether unions are "abhorrent" to the professional man—or the best method to "further his progress." They now had many of the facts to make the decision.

The argument carried on for two hours in the super-rarified atmosphere of Washington's Cosmos Club (whose membership list boasts the top engineers and scientists of the country) under the sponsorship of the Washington, D. C., section of the American Society of Civil Engineers.

• **How union is set up**—Most questions were directed at the soft-spoken Amann—himself a highly-trained engineer—who was out to "sell" his union to the group. By prefacing questions

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with such remarks as: "Now, I don't think I'd join a union, but . . ." to "Can workers really be required to join a union? If so . . .", the engineers showed a suspicion of the Amann-led ESA and a desire to learn just how the union operates and under what rules.

Amann explained that his nation-wide organization was formed 15 months ago and, with the addition of groups of engineers who had joined in private, separate associations or "unions," had grown to represent 40,000 scientists and engineers. He noted that these various units were autonomous—free to bargain and act according to members' wishes—with the only requirements for national ESA membership being that the members be "predominantly" professional, and certified by the National Labor Relations Board as bargaining agents in private industry.

• **Professional society stand**—Chandler countered that the professional societies—including the ASCE—were capable of aiding the engineer to gain his proper status and remuneration, that they had been doing this for years. He cited "constant harassment" by labor unions to sign up engineers in the past and explained that he was a leader in the fight to put in the Taft-Hartley Act the current provision that permits professional employes to join a group of their own kind, to join another bargaining group if they wish or to refrain from joining any organization at all. He emphasized his belief that the latter was the proper course with: ". . . The vast majority of engineers want nothing to do with collective bargaining except as a last resort."

Amann and Chandler agreed on such fundamentals as the importance of maintaining the "dignity" of the engineer, the separation of the professional and non-professional in collective bargaining, the keeping of professional engineers at the head of their collective organizations.

• **Points of disagreement**—But the areas of conflict were sharp and clear. These were the fundamental issues of unionism raised by the questioners and the answers—supplied by Amann and Chandler:

What is the ESA position on compulsory unionism?

Amann: "Some member units of ESA have the union shop (where an employe is required to join the union within 30 days to hold his job), that is the prerogative of the individual unit. We are not opposed to compulsory membership."

Chandler: "I just don't think a man should be compelled to join any organization to hold his job."

In joining a union, don't you set yourself up against management and block your road to management?

Amann: "That argument is a little silly; it doesn't block your progression into management. That's building up a bogey man of management. All engineers aspire to become managers, but I suspect the vast majority of the existing 500,000 engineers are destined to remain employes the rest of their days."

Chandler: "It gripes my soul to find these men full of animosity toward management . . . to develop strife between employer and employe. It doesn't have the faintest resemblance to professional attitude."

For whom does ESA bargain?

Amann: "We are interested in those large groups of engineers who cannot deal with management directly. If the groups are small, we cannot do a thing for them." (Amann noted earlier that during and after World War II, companies hired engineers and scientists by the hundreds of thousands and that ESA was formed as "an organization to speak for them.")

Chandler: "Our societies are trying to do that, to develop better relationships. Perhaps we are overemphasizing the downtrodden young engineers of the very large companies. Conditions would be improved if groups negotiated on a dignified basis."

What can ESA do that engineers can't do in single units?

Amann: "Our local units bargain on an individual basis, but a national organization is needed for recognition. For instance, our union can carry more weight and prestige in appearing before Congress to support or fight legislation than a single unit can. The professional societies are mixed groups of management and employes who want to speak for engineers. How can they?"

Chandler: "I'm at a total loss to find where ASCE is trying to usurp any union voice. We hope for results on a dignified straightforward action by employes. It's abhorrent to me to have a great big union throw its weight around and try to affect the life of the country."

What is the ESA attitude on striking?

Amann: "All bargaining rests on some type of ultimate weapon—a strike on the part of the union, a lockout on the part of management. As a last resort my organization will use this device if necessary." (At this point the strike by the ESA unit at Sperry-Gyroscope was discussed and Amann asserted: "Even professionals can be provoked into taking professional action.")

Chandler: "That part is offensive to those who don't like collective bargaining on the part of engineers. We believe that professionals can get along with employers without striking or stopping production."

What material good can ESA do for engineers?

Amann: "More and more engineers are now employed in large numbers. Twenty years ago an engineer with 20 years' experience earned four times as much as a beginner—now it's only half as much. Also, engineers are expected to work overtime hours without added compensation. ESA units now have contract provisions for compensation for work in excess of the normal work day or week.

"For an engineer who feels dissatisfied—such men can organize as a group and select from their own ranks of representatives to discuss their common problems with management.

"They will find they can better their situations."

What about the Kearns Bill?

Chandler: "This bill would amend the Taft-Hartley Act so that organizations of professional personnel . . . could not be classified as labor organizations even though their activities might include dealing with employers concerning conditions of employment, salaries, etc. NSPE supports this bill."

Amann: "We are opposed to the Kearns Bill because it would reestablish company-dominated unions that were outlawed in the 1930s."

What assurance have you that your organization (ESA) won't be taken over by some of those slicker organizers in big unions with vast resources of funds?

Amann: "We're of above-average intelligence, we don't propose to let that happen. (At this point, it was stated that the ESA unit at Minneapolis-Honeywell is now headed by a full-time non-professional. Amann replied: "That's unfortunately true.")

Chandler: "That points up the danger of unionization."

Summarizing at the finish:

Chandler: "Engineering, as a profession, stands higher and has more prestige than ever before. In straightforward employment, the engineer is pretty apt to get the recognition he deserves."

Amann: "It is only through collective bargaining that the wishes of engineers employed in large numbers can be made known to management. Collective bargaining is here to stay."

BARNES—"Unionism is incompatible with professional status."

MCCOY—"When an engineer joins a union, he loses touch with his employer."

CONVERSE—"If they use our uncivil engineers, they have to use our civils."

Field trial

Ohio Turnpike is center of organizing attempt

While the high-level debate was going on in Washington, young civil engineers in Ohio were wrestling with the issue on a less academic plane, and in the light of daily economic reality.

The question began to look more like a choice between no work—or at best shrinking job opportunities—if if they clung to individual bargaining, and union shop conditions with what to many of them seemed to be loss of professional status.

The national professional groups, and their Ohio subgroups, were listening sympathetically and urging the young men to resist unionism. And employer groups representing contractors on the Ohio Turnpike and elsewhere, were softly suggesting that their member firms stand up to the international union of operating engineers' local in Cleveland, which was pushing its drive to organize civil engineers.

The employer groups and professional societies were telling their members, "Resist. We're behind you." And they were—way behind.

But a showdown may be in the making in Ohio, and there are indications that professional groups are beginning to think about giving more than moral support. Here's the story:

• **Organizing move**—More than a year ago Frank Converse, president of Local 18 of the operating engineers (9,000 members in all but three counties in Ohio), set up Local 18C to organize civil engineers among others, and to build up a pool of field and office workers which could be made available to contractors working on projects within the jurisdiction of Local 18.

Converse—a shrewd, aggressive organizer with a lot more insight into the engineers' problems than many of them were willing to admit—held most of the cards, and unless the professional groups had an ace in the hole, or could catch Converse cheating, or learned a lot more about his brand of poker than they did, he was almost a sure bet to win—at least this hand.

• **Opening wedge**—For several years Converse has bargained for many professionals in the Cleveland area who had been members of the AFL Federation of Technical Engineers. Wedge for his more recent—and more controversial—organizing efforts was the decision of the Ohio Turnpike Authority to have contractors on the turnpike do the layout work for the sections they contracted to build, leaving them open to pressure by unions with whom they must deal.

So, last year when work on the pike got under way, organizers of Local 18C approached contractors with two alternatives: Sign up your layout crews or use men we send you. A few contractors urged their engineers to join Local 18C, in some cases paying their dues for them.

• **First showdown**—When one contractor, Terry & Wright, of Louisville, Ky., backed up one of its engineers, L. S. McCoy, when he refused to join, there was a showdown.

For a week Terry & Wright was struck by operating engineers, and then the fight was called off for the winter because of weather. Now, with spring coming, McCoy—who earns more than Local 18C could get for him—can't leave his office shack to work in the field for fear of precipitating another strike.

• **Opposition**—The McCoy case serves to point up the strengths and weaknesses—of the contending groups. McCoy and his employers saw themselves as defending the principle of an engineer's freedom of choice about joining a bargaining group.

But theirs was a lone defense. The Ohio Contractors' Assn. was interested in the case, but there didn't seem to be much the association could do. The local sections of the ASCE lent moral support, as did the Ohio Society of Professional Engineers.

Now, despite having had the winter to gather their forces, McCoy and his employers still find themselves pretty much on their own. There's dark talk of unfair labor practice charges against the operating engineers, and of asking the National Labor Relations Board to hold a representation election. So far no rival bargaining group has emerged.

The contractor's association—the only group of the three which meets Converse and his union across the bargaining table—has taken no stand. A spokesman for the association told ENGINEERING NEWS-RECORD: "This problem did not arise until the turnpike started, and we've got to see how things work out. If they (the engineers) choose to be represented by the union, why, then we'll recognize them."

Young engineering employes working in layout crews on the turnpike seemed solid in their opposition to joining a construction union, but a good many of those interviewed by

Field trial . . .

ENR showed wistful interest in the prospect of increasing their pay over present rates through the union.

In recruiting engineers as members of his union, Converse had little to offer most young sub-professionals besides higher pay and regulated working hours. And the heated arguments over whether unionism destroys professional status became academic in the Ohio tangle as employers and employes alike insisted that a couple of years in a union wasn't going to destroy the managerial urge in those who were "management material."

The layout men Converse offers to contractors with whom he has agreements—and with whom he hopes to have an understanding—are not, for the most part, engineering graduates. On one local 18C-manned project Converse showed ENR, a new plant for the Ford Motor Co. outside Cleveland, no survey crew member had an engineering degree. These men have been trained on the job with supplemental instruction in classes offered by Converse and taught by a retired civil engineering instructor.

It seemed probable that a sig source of annoyance of the ASCE and the OSPE was the possibility that young engineering graduates would be deprived of the opportunity to get field experience—at least when jobs are scarce and the older local 18C members must come first.

The professional attitude was summed up by George E. Barnes, head of the Department of Civil Engineering at Case Institute in Cleveland: "It's of concern if, at the beginning of a young fellow's life, he has to join a union to get a job."

Tax law revisions aimed at answering long-standing complaints of business

The tax revision bill that finally came out of the House Ways and Means Committee, after months of hearings, had most of the good news long promised to business, but it also included an unexpected dash of bad news.

In the final phases of voting the massive bill out of committee, it was decided to include a one-year extension of the present 52% rate on corporation profits. The rate would have gone back to 47% April 1 if the committee had not acted.

• **Pay-as-you-go system**—Most of the bill is devoted to revision of the basic tax law—the most comprehensive job of its kind on record. It follows fairly closely the recommendations of President Eisenhower.

Except for the continuation of the 52% corporation income tax rate, the bill has only one change which business groups widely opposed. This would affect only 35,000 corporations out of the 400,000 or so that file income tax returns. Corporations paying more than $50,000 a year in taxes would be put on a partial pay-as-you-go system. Beginning next year, they would be required to estimate their profits for that year, and pay 5% of the estimated tax liability in September, and another 5% in December. This amount would be stepped up gradually, until these corporate giants are paying 25% of their tax liability in September and another 25% in December. If this plan works, it may be applied to smaller corporations.

The provision giving faster tax amortization on plant and equipment would allow write-off of about two-thirds of the cost of the investment in half of its tax life instead of only one-half the cost in half the life as now specified (see page 144).

Here's a look at some of the other key revisions recommended:

• **Loss carryback**—A new amendment would allow businesses to apply losses against the profits of two preceding years, instead of one year as under the present law. It would help many businesses that operate on a narrow cash margin.

• **Income earned abroad**—U. S.-owned enterprises abroad would get a tax break of 14 percentage points. Instead of the basic 52% corporation income tax rate on profits earned in the U. S., the rate on income earned abroad would be 38%. This differential already is applied to U. S. corporations that do most of their business in the Western Hemisphere.

• **Partnerships**—The committee decided to treat partnerships as separate entities, rather than as a mere agent of the partners—if the partners decide they want this option.

• **Pensions**—New treatment is provided both for what employers pay into pension and profit-sharing funds, and for sums received by employes from such funds. New rules are spelled out for pension trusts which want to be tax-exempt. For example, plans devised to throw most of the benefits to a few executives would not qualify. Pensioners get a more liberal deduction of amounts paid by them into such funds during their active working years.

• **Surplus accumulation**—Business has long complained that present rules about undistributed surpluses were interpreted too rigidly. Under a rule-of-thumb followed by the Internal Revenue Service, if a company retained more than 30% of earnings, it had to prove this was not a device to avoid tax. If it could not satisfy the tax collector, penalty taxes ranging up to 38.5% were assessed. The new bill would shift the burden of proof to the tax collector. In addition, the bill exempts the first $30,000 of accumulated earnings from penalty taxes.

Virginia toll road

Richmond-Petersburg and western routes approved

Virginia's legislature has approved construction of the 36-mi, $157-million Richmond-Petersburg turnpike and the $75-million, 75-mi toll highway in western Virginia.

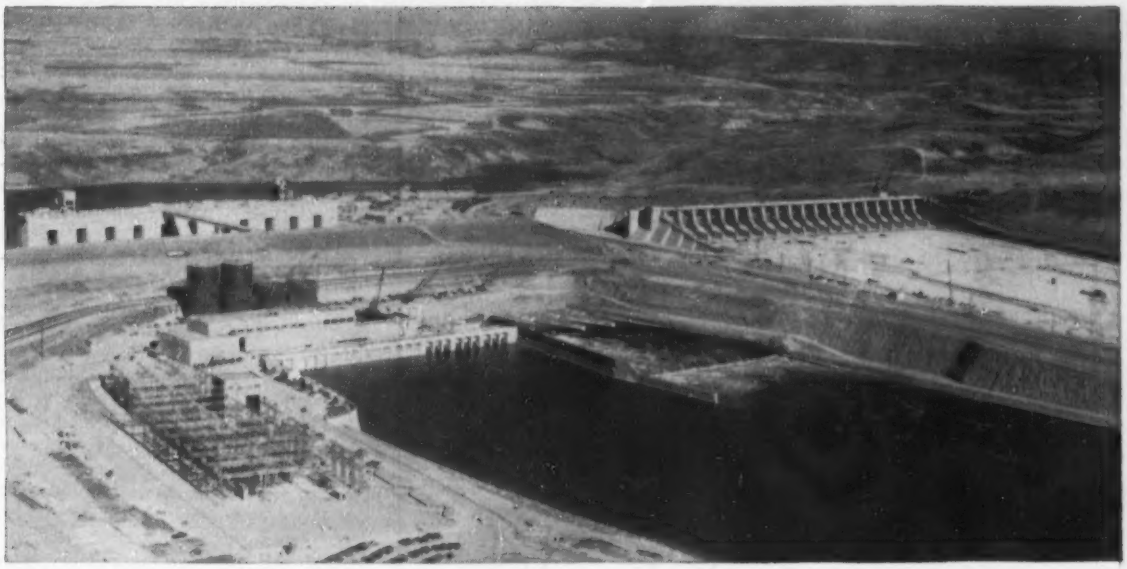
The latter route will connect the West Virginia turnpike with the authorized North Carolina turnpike. To be built by the Old Dominion Turnpike Authority, the western Virginia turnpike (ENR Aug. 27, 1953, p. 24) will run from a point on the state line near Princeton, W. Va., to a border point near Mt. Airy, N. C.

The Richmond-Petersburg Turnpike Authority will build the toll facility (ENR Aug. 6, 1953, p. 24) linking the two major cities. Both of these new turnpikes originally had been envisaged as projects to be carried out by private firms.

The western Virginia project has been approved in both the House and Senate of Virginia but the Senate must concur with a House amendment on the makeup of the authority before final action. When the bills are signed by the governor both authorities will have power to proceed with the work.

The authorities will be independent of the state highway department but will work closely with the department in planning construction. Both roads are to be free when bonds, issued to finance construction, are retired.

Two possible routes have been mentioned for the western Virginia turnpike: one on a direct line to link the West Virginia turnpike with the authorized North Carolina toll road, and the other to loop over to the east of a direct line in order to pass through Giles and Pulaski Counties.



Missouri starts making power for Midwest

Initial production of hydro power is started at Fort Randall Dam; ultimately it will be increased to 320,000 kw.

J. R. Carr
Associate Editor

With the flip of a switch, the sluggish Missouri River was put to work this week in South Dakota, when the first of eight 40,000-kw generators was officially placed in service at Fort Randall Dam.

Appropriate dedication ceremonies were held at the site of the $198-million project on March 15, officially starting the huge generator to work. Previous trial runs had assured all was in readiness. President Eisenhower participated—by long distance—with a telephonic communication from the White House that started the first power surging on the line.

The output of this first unit will be only about 3% of the total capacity of Fort Randall and its three companion dams—Garrison, Oahe and Gavins Point.

But the big generator holds special significance, since it begins a great new development in the Missouri River Basin—one phase of the nation's first broad program to harness the mighty Missouri.

• **Statistics**—Here are some statistics on this big 29-ft dia generator:

It weighs 1,195,000 lb.; working 24-hr per day at its full rated capacity, it could generate enough electricity to serve 150,000 residences; the 258,000-lb stator contains 24,000 lb of copper winding; its outer edge will spin at the rate of 7,825 fpm.

Another yardstick on these vertical waterwheel generators is cost. Westinghouse Electric Corp. holds an $8.2-million contract for fabricating and erecting the eight generators and auxiliary equipment such as switchgear, transformers, control panels and substations.

The Allis-Chalmers Manufacturing Co. holds a $5.4-million contract for the eight hydraulic turbines that drive the generators. Donovan-Lovering-Boyle have a $13-million contract for the powerhouse, and the Pittsburgh-Des Moines Steel Co. has an $8.4-million contract for the eight penstocks and surge tanks.

The powerhouse is 710 ft long, 100 ft wide and 150 ft high, of which 50 ft extend below ground level. The 60-ft dia steel surge tanks are 100 ft high. Eventually the powerhouse will contain eight generators with a combined capacity of 320,000 kw.

The 900x250-ft switchyard, containing steel towers, transformers, circuit breakers and other related switchgear, is one of the largest in the United States. Power leaves the switchyard over 115,000-v and 230,000-v lines, linked with the Missouri River Basin power network for transmission to various local systems.

• **Army builds**—Fort Randall Dam and power plant is being constructed by the Corps of Engineers. Power from the project will be transmitted and marketed by the Bureau of Reclamation.

Col. Thomas J. Hayes, III, Omaha district engineer, under whose direct supervision the Fort Randall project is being carried to completion, said the dam proper will be completed essentially by the end of this year. Work now under contract will complete the spillway and powerhouse, and bring the earth-fill dam up to the full 160-ft crest elevation.

Storage of water in the reservoir began last spring. At present nearly 1,400,000 acre-ft of water is impounded above the dam—creating the largest body of water in South Dakota. When in full operation the reservoir will extend 150 miles upstream, with a maximum controlled storage capacity of 6,300,000 acre-ft.

Actually, this first generator won't reach its peak of production for some time. The water now stored behind the dam is high enough to permit generation of only about 20,000 kw of power. Other generating units will be put on the line at three or four-month intervals.

As a power producer, Fort Randall will be third in size of the four main-stem dams. Oahe Dam, near Pierre, S. D., is the largest with an ultimate installed capacity of 425,000 kw. Garrison Dam, about 80 miles north of Bismarck, N. D., will have a total capacity of 400,000 kw. And Gavins Point Dam near Yankton, S. D., will have an installed capacity of 100,000 kw. These four main-stem dams will have a total installed capacity of 1,245,000 kw.

• **Reclamation distributes**—As shown in the accompanying map, the Bureau of Reclamation's network of trans-

MISSOURI BASIN transmission lines get initial power from Fort Randall Dam.

mission lines interconnects the four main-stem dams, and Fort Peck Dam in Montana. Constructing and operating this network is the responsibility of Bureau Region 6, under Regional Director F. M. Clinton, Billings, Mont.

Four lines in this system won't be completed before the end of 1956. They are: Fort Randall Dam–Sioux City; Big Bend Dam–Granite Falls; Oahe Dam–Bismarck; and Jamestown-Fargo. By that time, the bureau will have an adequate system of high voltage "backbone" transmission lines to deliver power from the main-stem dams to major load centers in all parts of the market area.

• **Reclamation sells**–Transmission of electrical power in the Missouri River Basin is a complicated procedure. In accordance with the Fort Peck Act of May 18, 1938, and the Flood Control Act of December 22, 1944, the Secretary of the Interior is charged with the responsibility of marketing the electric energy not required in operation of the projects.

The Bureau of Reclamation is the marketing agent. It operates under overall policies prescribed by the Department of the Interior, supplemented by detailed power marketing criteria for the Missouri Basin. In addition to its own lines, the bureau uses existing facilities of others in transmitting power to its customers. This is accomplished by so-called "wheeling" arrangements.

The bureau already has completed a number of such arrangements, and anticipates that this type of arrangement eventually will be in effect with every major utility located in the main-stem area of the Missouri Basin, as well as with a number of smaller utilities. Generally, these arrangements involve transmission over lines with voltage ratings from 12,500 to 59,000.

• **Big potential market**–Present indications are that demand for electrical energy in the Missouri River Basin will exceed supply for some time to come. With 325,000 kw of new and uncommitted power available for sale through 1956, preference customers have asked for 523,000 kw and non-preference customers, 224,000 kw.

• **Overall basin program**–How one views the progress of the $11.2-billion overall program to develop the one-sixth of the nation that is the Missouri Basin, depends on one's outlook.

The program has been called bumbling, grandiose and competitive. In one respect or another, it is all these things. It also has been called a magnificent chapter of achievement. Certainly it is this too.

The dollar expenditure stands as a clue to the physical accomplishment of the program's first decade. Army Engineers, with more than 75% of their projects either completed or in some stage of construction, have spent –in round figures–$925 million on a $3.4-billion program.

The Bureau of Reclamation's Region 7 (Denver) has spent $123 million on a $1.5-billion program. The bureau's Region 6 (Billings, Mont.) has spent $109 million on dams and pumping plants; $52 million on transmission lines; and $29 million on planning and investigation. The Department of the Interior's portion of the total program is $4.4 billion; that of the Department of Agriculture is $3.0 billion.

The work of the first decade is a long step towards a goal that in size dwarfs all that has been accomplished so far. The officially stated objectives of the program–which are due to be completed some time after the year 2,000–call for well over 100 reservoirs. It also includes irrigation for 5,000,000 acres of land, application of soil and moisture conservation measures on nearly 340,000,000 acres, hydro power plants having an ultimate installed capacity of 3,200,000 kw, and the safeguarding of 5,000,000 acres of valley land from flooding.

Mississippi may change bed, Congress warned

Army Engineers warned Congress last week that if conditions happen to be just right the Mississippi River could shift its course across southern Louisiana as early as 1965.

The gradually enlarging Atchafalaya River then would take the Mississippi's flow from a point near where the Red River runs into the Mississippi and carry it to the Gulf of Mexico. The shift could leave New Orleans high and dry some 80 mi to the east of the river bed.

Brig. Gen. John R. Hardin, Army Engineer and president of the Mississippi River Commission, told the House Appropriations Subcommittee that it was the conclusion of the commission that the Mississippi would divert its major flow within the relatively near future, if steps were not taken to prevent it. General Hardin predicted that the critical stage might be reached as early as 1965–that stage being the period when the river is in approximate balance, and when it may shift very suddenly. A program to control the flow of the Mississippi, Hardin said, would cost somewhere between $70 million and $80 million and would require about 8-to-10 years for construction.

ENGINEERING NEWS-RECORD will in the near future carry a feature story on Mississippi-Atchafalaya developments.

Dynamic weighing cited at meeting of North Atlantic highway officials

Dynamic vehicle weighing, a new aid to truck load law enforcement, was described last week in Washington, D.C., at the annual convention of the Association of Highway Officials of the North Atlantic States. The three-day program placed heavy stress on federal highway activities and at the close, J. N. Robertson, District of Columbia director of highways, was elected the association's president. He succeeds Connecticut State Highway Commissioner G. Albert Hill.

The truck-weighing device was the subject of a paper by O. K. Norman, chief of the Traffic Operation Section, U.S. Bureau of Public Roads. He described experience with the device during the past three years on a Virginia road near Washington. Called an electronic scale, it consists of a 3x10-ft platform installed flush with the roadway, over a pit. The platform bears on four pressure cells, which work on the electrical principle that the resistance of a conductor is proportional to its cross-sectional area. Loads change conductor cross-section in the cells.

Current through these cells is linked with an oscilloscope. When the platform is unloaded the oscilloscope shows a horizontal line. When a truck passes over the platform each axle load shows as a vertical bar above the line. These bars, which don't fade from the scope for several seconds, are scaled to get the axle loads.

Accuracy of observation has been checked at a nearby full-time truck-weighing station. In its present state of development the electronic scale comes within 5% of correct weight in 50% of its observations, vehicle speed has little effect on accuracy.

Although the electronic scale is not yet accurate enough to be used as evidence in truck-weight violation cases it could be used to screen possible violators from traffic stream; they would be directed to a static weighing station while obviously under-limit trucks could proceed without delay.

In discussing points of cooperation between truckmen and highway officials, Milton Kramer of Associated Transport, Inc., New York, urged upon drivers that they drive as close to the centerline as traffic conditions will allow. In this way heavy loads are kept away from pavement edges, where they can do greatest damage.

Fred Burggraf, director of the Highway Research Board, reviewing test road projects of the past three decades pointed to results on the Western Association of State Highway Officials test road near Malad, Idaho (ENR July 23, 1953, p. 26).

The outer wheel track on the road had been the first to fail in the project's thinner bituminous cross-sections. Until failure occured granular base material migrated laterally toward the edge. Migration stopped when failure took place. Now, in an attempt to check migration before it starts, paved shoulder strips 6 ft wide have been built along part of the road. Premature outer-lane failures have stopped in the zones having paved shoulders. The Highway Research Board, which is conducting the test, may try narrower strips of shoulder pavement.

W. Va. road practices sharply criticized

The spoils system is responsible for waste and inefficiency in West Virginia highway work and the State Road Commission's fiscal procedures are in need of drastic overhaul, it was asserted in a management consultant's survey report made public last week.

Stating its observations concerning "adverse political influence" in blunt terms, Public Service Administration, a Chicago firm, submitted its report to a legislative highway study committee. PAS had made a special progress report last September in order to call attention to a "serious lack of trained technical personnel, particularly young engineers (ENR Sept. 24, 1936, p. 26).

The report recommended establishment of a personnel office to include a complete set of personnel records, recruitment by merit system with a service rating basis for promotions, creation of a comprehensive classification and pay plan and a retirement system.

Recommendation also was made for a finance office to have complete responsibility for fiscal management and to take over accounting processes now widely dispersed. "All revenues should go into a common road fund" instead of the legislature earmarking these funds, the report advised.

"Almost from its inception the State Road Commission has been handicapped by continuous political influence having an adverse effect on all phases of highway activity including management, program development and execution, technical staffing and construction and maintenance operations," the report declared. It detailed three main effects:

- Political influence "has had a very serious indirect effect on the recruitment and retention" of a technical staff, particularly young engineers.
- Construction inspection has been particularly hard hit. Unsatisfactory performance by some field inspectors "undoubtedly is attributable to their reliance on political influence for retention of their jobs."
- "Another area in which the spoils system has had a devastating effect has been in the county maintenance operations. It will take years to undo the damage which has been done as a result of political influence."

"Unless the political leaders of the state agree to a merit system type of operation in the administration of West Virginia's highway system," the report concluded, "there is little hope for improvement in management or for obtaining full value for expenditures on the road system."

Think in statewide terms, sewage groups told

Two widely separated state meetings of sanitary engineering groups were given the same strong advice last week: Water and waste problems can't be solved piecemeal; you've got to think in a larger way; and the initiative should be yours.

New Jersey's state secretary Edward Patten—at the state's Sewage and Industrial Wastes Assn. 39th annual meeting in Atlantic City—referred to the confused water supply picture in northern New Jersey (ENR Mar. 11, p. 49). His attack was aimed generally at the lack of a strong central authority for all water and waste problems in the state.

At College Station, Tex., earlier in the week, Reclamation Commissioner W. A. Dexheimer told that state's Water and Sewage Assn., that solution of the water problem in Texas will come from statewide, and not piecemeal consideration.

County officials plan first highway show

An exposition of highway equipment is planned by the National Association of County Officials in connection with its 18th annual conference at Omaha, Neb., June 9-12. Headquarters for the associations will be at the Fontenelle Hotel. The exposition will be in the Ak-Sar-Ben Coliseum.

Details of the conference and exposition may be obtained from NACO headquarters, 1616 Eye St., Washington 6, D. C.

Army civil works

House committee trims budget by $29 million

The House Appropriations Committee tightened the drawstring last week on Administration requests for Army civil functions. In a bill that reaffirmed close congressional control over civil works spending, the committee cut $29.5 million off the President's construction figure and reduced his overall estimate for the Corps of Engineers civil works program by nearly $34 million.

Two new starts and one project resumption were dropped by the House group from the list of 20 starts proposed in the budget message (ENR Jan. 28, pp. 21-22). Excluded by the committee were two million-dollar jobs on Redwood City Harbor, Calif., and Kawainui Swamp, Hawaii, along with an $18-million resumption for Dillon Reservoir, Ohio.

For the other starts recommended in the budget message, the committee allotted just about what the President asked. On 17 such projects, the House appropriations group approved more than $18 million in fiscal 1955, to start an estimated $85 million worth of work.

New construction money approved by the committee for general construction allotments: $193 million to 16 multiple-purpose projects, $54 million to nearly 50 flood control and local protection jobs, and $34 million to about 20 navigation projects.

These allotments, of course, refer exclusively to new money appropriations for construction in the fiscal year starting July 1. The committee relied on carryover funds to help support construction on some projects.

• **Senate likely to restore**—Most of the cuts made by the House committee are likely to be restored before the bill passes the Senate. That body traditionally votes larger amounts for civil functions than the House appropriations group is willing to approve in the original bill. A good portion of the increases probably will be sustained in final conference between the two Houses.

Among the items that stand a good chance for increase are the allotments for general investigations and for advance engineering and design. The House group cut the investigations request by nearly $400,000 to a low figure of $2.4 million. Restricted funds for this purpose are already hampering basic work in surveys and collection of data, the Corps of Engineers has told Congress. The cut will probably be restored, along with a good part of the $300,000 lopped off the $2.5-million request for advance engineering and design.

Caustic criticism of the federal government's entire water resources activity was a feature of the House report. For several years, the committee noted, it had repeatedly stressed the need for a comprehensive and integrated water resources program. "Ability of governmental agencies, particularly the Bureau of the Budget, to ignore this need" is almost incredible, the report said.

As one bright spot, the committee noted that the Corps of Engineers and the Interior Department are getting close to agreement on uniform allocation of costs. But the report blasted the delusive quality of benefit to cost ratios as presented to Congress for project justifications. And it criticized the year-old Circular A-47 of the Budget Bureau as a "faltering step" toward uniformity in methods of determining the economic justification of water resources projects.

Job highlights

HOSPITAL—An $18.7-million contract for construction of the $23-million Grady Hospital, Atlanta, Ga., has been awarded to Robert E. McKee, Inc., Dallas, Tex., by the Fulton-Dekalb Hospital Authority, Atlanta. Robert & Company Assoc., Atlanta, are designers.

POWER PLANT—Design and construction of a $14.6-million sixth addition to the White River power plant of the Indianapolis Power & Light Co., Indianapolis, Ind., have been awarded to Gibbs & Hill, New York. The job is part of a $42-million four-year expansion program.

NEW COLISEUM SHAPE—New York City's planned coliseum at Columbus Circle will be part of a 26-story office building rather than the previously planned exhibition hall and shops. The change boosts the cost estimated from $20 million to $26 million.

BRIDGE CHANGE—New York's Kingston-Rhinecliff Bridge over the Hudson River, originally planned as a suspension span, has been redesigned as a continuous truss structure and its site moved 3.5 miles north to simplify approaches. David B. Steinman, New York, designed the $20-million structure for which bids will be opened April 20.

BRIDGE RAMPS—A $4.2-million contract for ramp construction at the Oakland-San Francisco Bridge has been awarded to Macdonald, Young & Nelson, Inc., and Morrison-Knudsen Co., San Francisco, Calif., by the California Department of Public Works, Sacramento.

Atom power plant

Pittsburgh firm to build first utility unit in U. S.

Atomic Energy Commission has designated the Duquesne Light Co. of Pittsburgh as builder and operator of the first full-scale atomic plant to produce electric power for utility use.

The $45-million plant is to be located in the Greater Pittsburgh area on a site furnished by Duquesne; power output will be integrated into the electric company system.

Duquesne is ready to go ahead as soon as the final contract is signed—and it's expected that construction will get under way this year. Completion of the plant is to be within three years.

Design of the atomic reactor, which will furnish the heat for the first large-scale power plant of its kind, is already well advanced at Westinghouse Electric Corp. in Pittsburgh. AEC last October awarded Westinghouse contracts for developing, designing and constructing the reactor.

Duquesne, according to its offer, will pay $5 million toward the cost of the Westinghouse contracts. In addition, the electric company agrees to:

- Furnish a site for the entire project and build and operate the new electric generating plant at no cost to the government.
- Operate the reactor part of the plant and bear the labor costs thus entailed.
- Pay AEC at the rate of 48.3 cents per million BTU's of steam used in the turbines for the first year; the rate increasing annually until it reaches 60.3 cents in the fifth year.
- Waive any reimbursement by the government of costs incident to termination of the contract.

AEC estimated that the Duquesne offer would save some $30 million in government spending on construction and operation of the plant.

The Pittsburgh atomic power plant will produce a minimum of 60,000 kw of power when completed. The pressurized water reactor (PWR) which will power the generators, is of the same basic type that will power the first atomic submarine, the Nautilus.

A land-based prototype of the Nautilus engine has been running at Arco, Idaho, for more than a year, and it is the only reliability test that has been conducted on reactors of this type.

AEC has indicated recently that it will invite bids shortly on a smaller, 1,250-kw, plant suitable for use at military posts. Army Corps of Engineers will be in charge of this "package" atomic power plant, which will also be a PWR type.

Reni photo

FROM MINE WORKERS building in Washington, UCW strength flows downward.

United Construction Workers: its structure and top people

G. T. Orick
Assistant Editor

Last week ENGINEERING NEWS-RECORD poked into a wrangle between the United Construction Workers and four American Federation of Labor building unions, over whether UCW or AFL would represent workers at First Fork Dam across Sinnamahoning Creek in northern Pennsylvania.

With UCW thus emerging as a point of labor contention within the industry, it should pay construction men to take a close look at this offshoot of John L. Lewis' United Mine Workers. The flat opposition of UCW's industrial-type organization to the AFL's craft unions was very clear as the two sides met before a National Labor Relations Board examiner (ENR March 11, p. 28).

During the NLRB hearing in the gloom of Emporium's 1890 court house, the AFL unions were represented by a young lawyer from Pittsburgh, given moral support by a group of business agents from affected and interested locals. The contractor—who during the hubbub sat reading up on tunnel building—was represented by a top-flight Washington lawyer, who had been associate general counsel to the NLRB until 1950.

Representing himself and his union was Adam Adamcyzk, regional director for UCW and District 50, United Mine Workers, to which UCW is attached.

• **The UCW way**—A quick look at Adam Adamczyk at work will make clear a basic difference between the UCW and the AFL building trades. Adamczyk acts on the direction of the UCW leaders in Washington. His organizational motives are theirs, and his successes and failures are theirs.

Adamczyk is no puppet. Far from it. But, unlike most AFL building union local leaders, who derive their strength from their relationships with members of their locals, Adamczyk was hired by the Washington headquarters of UCW. He was put on the payroll a few years ago as an organizer and was promoted to regional director because his record appealed to the top men.

Local autonomy is a problem not often faced by UCW headquarters. Nor is it a stimulus to growth, as it has been in many AFL unions.

Adamczyk — an ex-coal miner — handles his seven-county region with the anxious efficiency of a branch executive of a big business, translating top-level policy into local-level reality. He and his staff of three regional representatives, race through the hills at five cents a mile organizing a factory here, settling a grievance there, promising employers a "day's work for a day's pay."

• **Origins of policy**—The gradually increasing pressure for growth of UCW originates within the United Mine Workers Building in Washington, where, on an upper floor, John L. Lewis' brother Denny and a staff of intense administrators work in what until now has been secrecy.

An imitation of the CIO in construction—that's what UCW has been termed. It may be true, but only to the extent that the implications of the label are understood. The CIO, of course, was a brain child of John L. Lewis, and UCW was organized within it in 1939, by Lewis to give AFL building trades leaders—and his old enemy William Hutcheson of the carpenters in particular—a run for their money.

Why, then, has UCW not taken hold like the CIO?

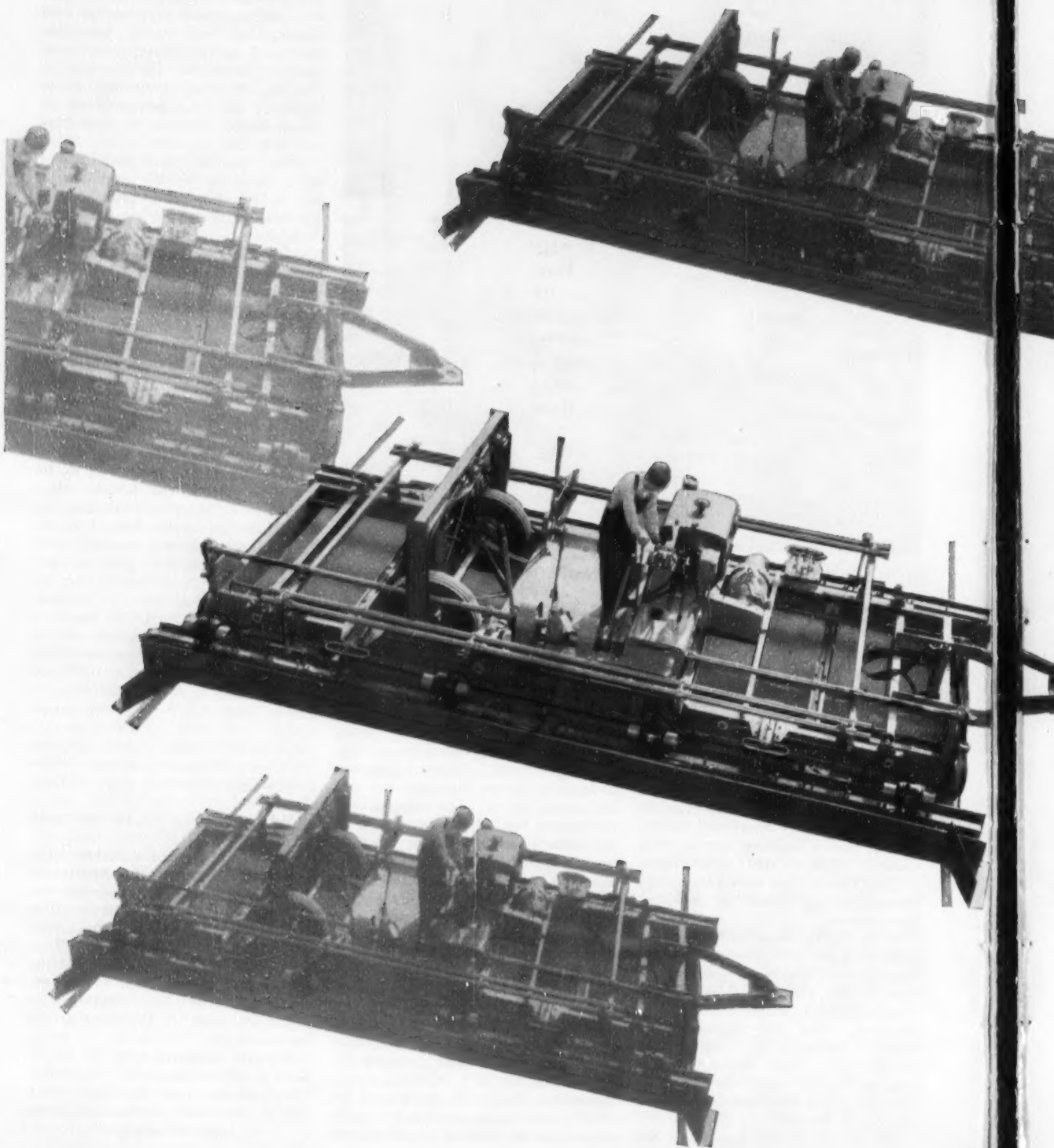
The answer lies in the nature of the construction business, the structure of UCW, its motivations and—not surprisingly—in the traditions of the AFL.

When UCW followed Lewis out of the CIO, the logical place for it was in District 50 of the United Mine Workers. It's been there ever since, sharing District 50's administrative personnel, both in Washington and on local levels.

Separate books are kept for UCW by O. B. Allen, District 50 comptroller. Check-off dues, sent to Allen's office directly—in most cases—from employers

(*Continued on page* 32)

Leading midwest contractor ord



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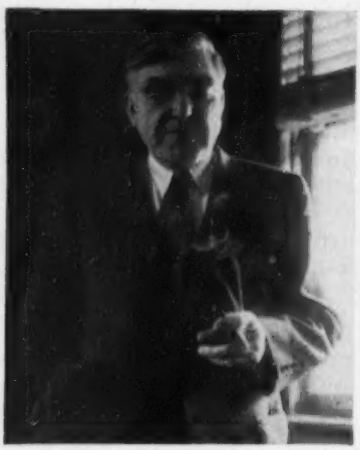
UCW leaders, a tight group, control from top down

ENR photos by Compton

DAY-TO-DAY director of UCW Washington staff, Luke Brett, was a miner at 13.

RESEARCH CHIEF Edward Kennedy, is a nuts-and-bolts data digger.

O. B. ALLEN, UCW-Dist. 50 comptroller, keeps daily to-the-penny track of costs, has fought AFL building trades 15 years.



A. D. LEWIS has run UCW since brother John L. organized it in CIO in 1939. He sees UCW growth as unhurried, certain.

with whom UCW has contracts, are balanced daily against expenditures. Allen can tell you from firsthand experience—including thugmarks on his head—the difficulties of trying to organize UCW in an AFL stronghold. That was in Cleveland, in the early 1940s, and the city is still an AFL stronghold.

• **Men in the shadow**—Denny Lewis has run UCW from the start. To what extent he is simply an agent of his brother is not known, for the whole image of the UMW and its empire has been shaped by the publicity buildup of John L. Lewis. The Mine Workers have a symbol, and that's the way they want to keep it.

Denny Lewis is not alone in the shadow of his big brother. Secrecy has become a way of life for the men of his top-level staff, and it was clear as they talked to ENGINEERING NEWS-RECORD that they were not used to telling the details of their union.

Key jobs at UCW headquarters are held, with a few exceptions, by men who came up through the coal mines. They, like the regional directors, are administrators, hired, not elected, and the structure of their organization centralizes power at the very top.

"We can benefit only from the wealth we help create." That's how Luke Brett, operating executive of UCW-District 50, puts into words the outlook he passes down to his regional aides as they pull up around bargaining tables. "The difference of opinion between employer and employe is over how much of the money we help an employer make should be shared with the workers."

Edward Kennedy is a nuts-and-bolts research director. He doesn't busy himself with cosmic inquiry about economic trends when he gathers material about an employer as ammunition for regional men to use in bargaining. He doesn't have to: Attention to economic and sociological trends is reflex thinking, from the depression days when he was Washington spokesman for a farm group and later the research brains behind Fr. Charles Coughlin.

• **How many?**—The administrators of UCW leave estimates of the size of membership up to the questioner. Closest guess, based on scant information, is that there are, at tops, 15,000 workers represented by contracts with perhaps 150 contractors. There probably are several times this number working in building supply industries.

• **Why so slow?**—Contractors with UCW workforces say they like the union. "It's bad enough to fight nature and the job; why should we have to fight a union too?" is the way one contractor put it.

Why, despite the friendly feelings of contractors who know UCW, has the union been so slow in growing?

For one thing, there's been no all-out drive, except in the coal regions. UCW's secrecy hasn't helped either, and the lurking possibility of reprisals against contractors who desert AFL for UCW is said by officials of the union to scare off many employers.

A serious weakness in any expansion plan is the lack of appeal of UCW to most specialty contractors, especially in cities, where AFL crafts are strongest. An industrial-type union offers few advantages, say the specialty employers, to a firm which wants workers with narrow skills. Refusal of the Lewis team to recognize the Taft-Hartley law doesn't hold up as an explanation for slow growth. If the AFL building trades and the contractors with whom they deal had to do everything in strict observance of T-H, there would be little construction done.

Biggest areas for expansion of UCW for the next few years probably are heavy construction, dams, and roads, where specialty skills are not so important, and home building, which is only about half unionized. Maybe UCW is ahead of its time. If that's so, Denny Lewis and his staff are patient.

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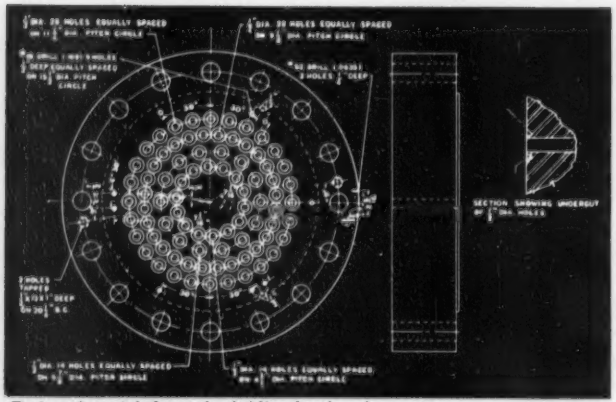

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REARRANGEMENT of large rocks on Fort Peck Dam upstream face is final step of work to prevent erosion of gravel bed underlying riprap. Note orange peel bucket.

Blast for better riprap

Outsize riprap on Montana's Fort Peck Dam has been broken down in an experiment to determine the best method for improving the great earth-fill structure's wave resistance.

The work, performed for the Army Engineers by Cass Company, Ogallala, Neb., contractor, covered a 60 x 1,460-ft strip on the four-mile dam's upstream face. In this zone engineers had noticed that the gravel bed underlying some of the riprap was washing down the slope between the stones.

These stones, weighing from 2,000 to 20,000 lb, had been brought on flat cars from a quarry and placed on the 18-in. gravel layer when Fort Peck Dam was built across the Missouri River in the late Thirties. Since then waves having a maximum fetch of 25 mi have dashed against stones in the drawdown zone, seeking weak points where the riprap might be undermined. The ultimate danger is exposure of earth fill and its rapid erosion.

The purpose of the Cass contract was to check gravel erosion in two areas where it already had begun, and to find an economic method for preventing such erosion elsewhere.

Three methods were specified, all involving closing the interstices between stones and breaking down the larger stones. According to Army Engineers, since Fort Peck was built they have found that the larger stones are not necessary.

All three methods had the same initial and final steps. The first step was to place 4 in. of new gravel in rock interstices wherever additional cover was needed. The final step was to rearrange rocks to obtain a uniform appearance; space-filling stones were held down by surface stones weighing at least 500 lb.

In between, there were variations in the methods. The first one was to cover the exposed gravel with spalls and small rocks, then blast all stones over 6,000-lb size (about 40 cu ft). Spalls and small rocks were obtained from a nearby stockpile, or they were obtained by blasting designated excess or oversize stones on the dam's face. They were hand-placed.

A second method was roughly the reverse of the first. Stones over 6,000-lb size were blasted in place, then the interstices were hand-filled with spalls and small rocks, covering the gravel. Where the blasting did not produce enough spalls and small rocks they were brought from the stockpile.

The third method called for drilling and blasting the corners and sides of designated stones weighing more than 4,000 lb, producing in place enough spalls and small rocks to fill the passageways between the stones. Next, large rocks not firmly seated in the gravel were drilled to a depth at which blasting would blow the bottoms out, producing spalls and small rocks in place underneath. Then all stones over 6,000 lb were blasted.

Rock-breaking with the headache ball also was tried, but it caused too much shattering.

A unit-cost breakdown was required of the contractor, because of the work's experimental nature. All methods were found effective, and the second one cost somewhat less than the others—not enough less, however, to make cost a controlling factor in method selection, according to Army Engineers. Payment to the Cass Co. was $34,325 for work on 9,730 sq yd.

District engineer for Fort Peck District, U.S. Army Corps of Engineers, is Lt. Col. Erland A. Tillman.

BEFORE BLASTING, riprap stones had wide gaps between them. Gaps permitted high waves to lash at gravel underneath.

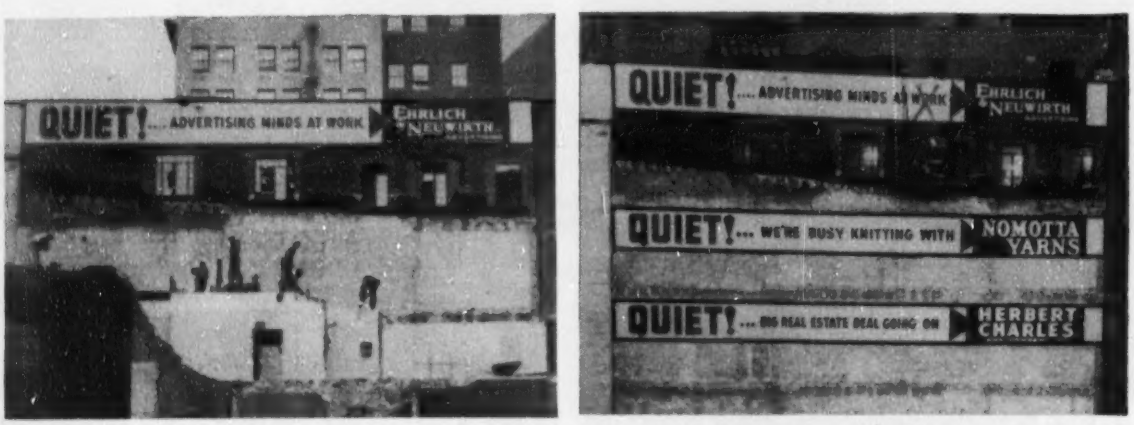
AFTER BLASTING, there were plenty of spalls and small rocks available for hand placement in the gaps.

Dept. of Defense photo

Army Engineers in Korea beat the "Mad" Imjin to build Libby bridge

Since firing stopped in Korea long lines of trucks no longer haul supplies to the front across the Libby Hi-Level Bridge spanning the Imjin River. Today, it serves civilian transport, but it remains a tribute to the 84th Construction Battalion that put it across the "Mad Imjin" when sub-zero weather froze the equipment and enemy fire was often only 1,000 yd away.

Opened to traffic last July, the bridge is 1,074 ft long, 79 ft from the top of the I-beams to the bottom of the caissons. Eight steel sheet pile piers were driven to the bedrock and filled with concrete. Reinforced concrete columns rise 44 ft. There are five 48-in. built-up beams, spaced on 57-in. centers from the bridge centerline, and decking is corrugated sheet steel.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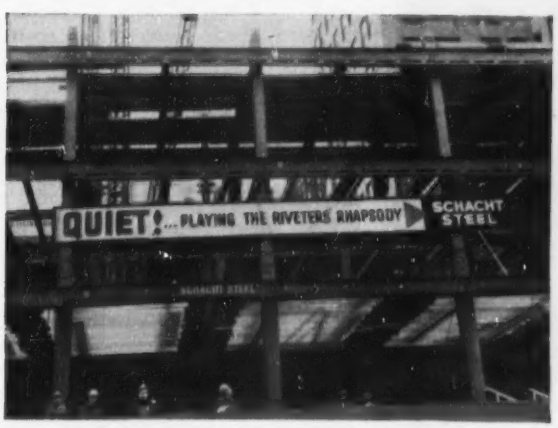
Over a New York City street, this sign appeared . . . inspiring several others . . .

FAST POUR AT VANCOUVER

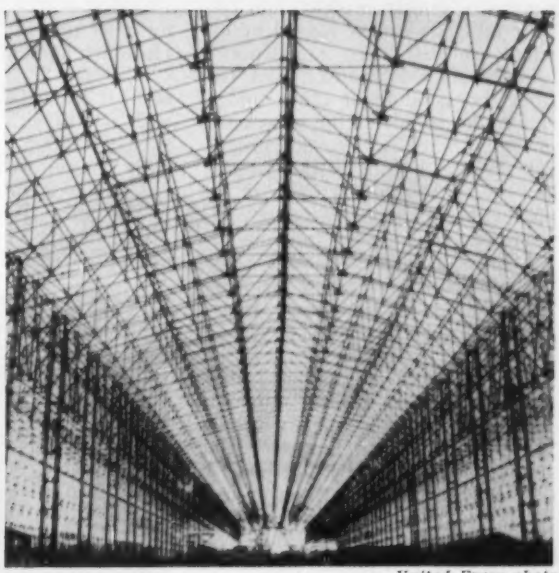
For 168 continuous hours concrete was poured into slip-forms to raise this 1,550,000-bu capacity monolithic grain elevator at Vancouver, Wash., for the Spokane, Portland and Seattle Railway.

Concrete was pumped upward through an 8-in. pipe to the top of the lift-jack deck where it was dumped into hoppers at an average rate of 900 cu yd a day. Rate of pour was about 8 in. an hours—at top speed, about 16 ft a day. Hand and power trucks moved the concrete into the forms which were then lifted simultaneously with 400 jacks.

The completed structure has 23 bins, 30 ft in diameter and 115 ft high and a headhouse, 36 ft by 54 ft and 97 ft high. Total cost will be about $2,000,000, including mechanical car dumper and headhouse equipment.



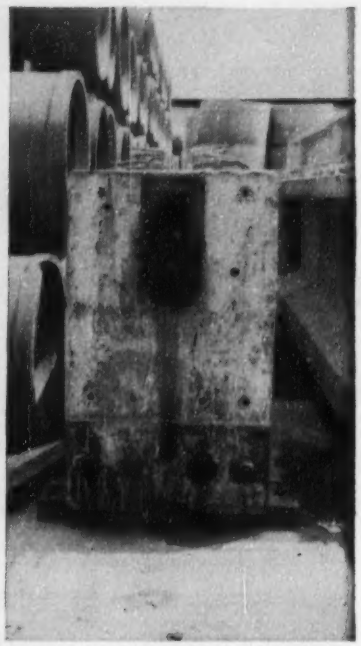
. . . including one by the contractor.



United Press photo

FRAMEWORK FOR FLOWERS

More than 800 tons of steel tubing forms the skeleton of this hangar in Valenciennes, France, where it will house a horticultural exhibit this spring. The roof will cover an area 1,351 ft long, 138 ft wide and 42 ft high, making it one of the largest hangars ever built in Europe.



Four anchorage types In Massachusetts, concrete beams were post-tensioned by four methods. Two of the anchorages are shown above—strands with swaged fittings held by nuts (left) and bars anchored by nuts.

Experience with bridge prestressing methods

The Massachusetts Department of Public Works has completed an experimental project in which four concrete bridges were prestressed by different methods. The experience it gained from this contract, plus that from the building of other bridges and from analysis of the experiences of other state highway departments will serve as a guide to the MDPW and others in avoiding some of the pitfalls that might be encountered in prestressed concrete construction.

Many of the difficulties the MDPW ran into actually were of a minor nature. Because of the present experimental stage of prestressed concrete construction in the U.S., however, any unexpected incident during fabrication or erection attracts attention. There is no reason to conclude, though, that prestressing is more troublesome than other methods of construction, MDPW engineers say.

The four bridges prestressed by different methods are on the Newbury-Newburyport project on Route 1 near Boston. A single contract for $158,490 was awarded in June, 1952, to New England Concrete Pipe Co., Newton, Mass., for furnishing 98 prestressed beams for the bridges, plus one beam of each type for testing (ENR July 3, 1953, p. 103).

• **Anchorage methods**—The first structure to be erected—the Scotland Road Bridge—required 24 beams of 65-ft span. Each was prestressed with three 1⅛-in. dia bridge strands. These had threaded swaged fittings on the ends for anchoring the steel at beam ends (Roebling method).

The Hale St. Bridge took 18 beams of 64-ft span. These were prestressed with 10 cables, each consisting of twelve 0.196-in. dia wires anchored with conical wedges at beam ends (Freyssinet method).

The Storey Ave. Bridge called for 36 beams of 58-ft span. Each was prestressed with four 1⅛-in. and two ⅞-in. dia high-strength steel bars with threaded ends for anchoring (Lee-McCall method).

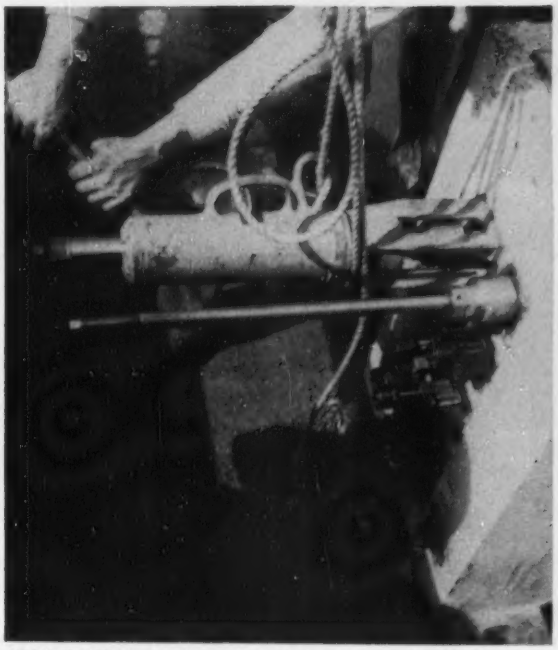
PRESTRESSED BEAM spans 65 ft in Scotland Road crossing.

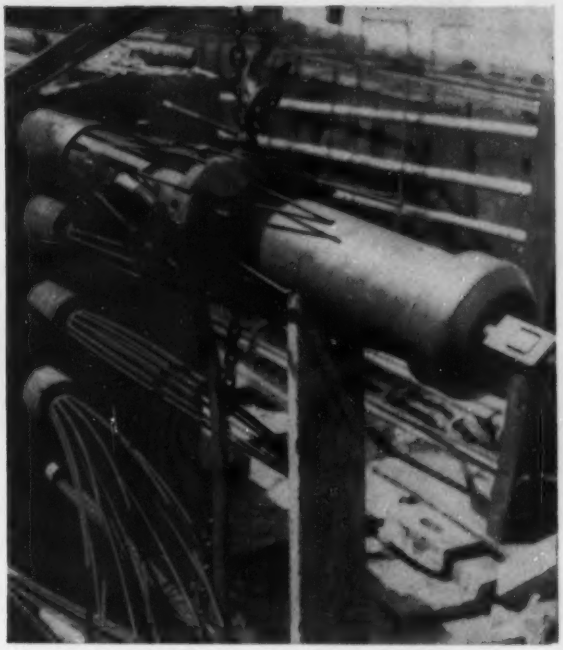
The Pine Hill Road bridge required 20 beams of 59-ft span. These were prestressed with twelve 6-wire cables of ¼-in. dia wires. The ends of the wires had pressed-on heads for anchoring (Prestressed Concrete Corp. method).

All beams have an I-shape cross section. Bottom flanges are 24 in. wide and top flanges, 20 in. wide. Webs are 6 in. thick. For three of the bridges, designed for H20 loading, the beams are 3 ft deep, while for the fourth—the Scotland Road Bridge—designed for H20-S16 loading, the beams are 3 ft 8 in. deep. Generally, the beams were spaced 4½ ft apart, and the cast-in-place deck was bonded to them.

In all cases, the prestressing "tendons" (bars, cables or strands) were end anchored. Not bonded to the concrete during initial prestressing, they later were grouted to establish bond.

• **Costs of beams**—The fabricator bid $1,722 apiece for the Scotland Road beams, $1,455 for the Hale St. beams, $1,345 for the Storey Ave. beams and $1,649 for the Pine Hill Road beams, including transportation over 40 miles from casting yard to site. The general contractor bid $25 each for erection. Average cost per cubic yard





ALSO USED for anchorages in this experimental highway bridge project were wires held by pressed-on heads against a steel cylinder and shims (left) and wires gripped by conical wedges, tensioned and anchored with a double-acting jack.

for the prestressed beams is $210.

Cost of superstructure per square foot is $10.00 for Scotland Road, $9.60 for Hale St., $8.50 for Storey Ave. and $10.60 for Pine Hill Road. (It should be noted, however, that if Freyssinet and Prestressed Concrete Corp. recommendations had been adopted, the Hale St. and Pine Hill Road beams could have been prestressed with about 15% less steel.) These costs average about 10.5% more than for composite steel-beam and concrete designs, MDPW engineers note, but are about the same as for non-composite steel and concrete construction.

• **Labor requirements**—The number of man-hours required for fabricating each of the four types of beams is recorded in the accompanying table, compiled by G. M. Gaffney, resident engineer for the MDPW. As indicated, the Roebling method, which required only three tendons, absorbed the least number of man-hours.

Each prestressing method required two jacks of a compatible type for the tensioning operation; other equipment was the same for all types. Also, the casting crew and the time element for placing concrete in the forms was the same for all types. The crew consisted of two men for placing the concrete, a truck driver, a mixer operator, a charger operator, two crane operators, a batch man and three men for feeding the mixer.

• **Fabrication of beams**—Casting, curing and tensioning were carried out in an outdoor yard at Newton, Mass., the work on the Scotland Road beams being done during the winter. The fabricator set up two casting beds, which he enclosed for winter work. He used high-early-strength cement, and cured the concrete with steam.

During the early stages of the contract, only one set of adjustable forms was used. Later, on receipt of a contract for an additional 24 beams, the fabricator set up another bed and built one more set of forms. His schedule permitted production of about five beams per week per pair of beds.

Reinforcing steel for each beam was fabricated into a cage. Metal end dams, tied together with a pair of steel channels, were placed at cage ends, and the prestressing tendons inserted. This unit then was set on the wood-plank bottom forms for the beam. Side forms were stripped from a beam cast the day before and positioned around the cage.

These forms were made of light-gage steel. They could be used for all the different length beams required for this experimental project because of the standardization of cross-sectional dimensions and details. While the over-all length of members varied, the distance center to center of diaphragms was kept constant. And though some of the bridges had large skews, the fabricator developed a diaphragm design that required little alteration of the forms. His detail called for turret-type diaphragm stubs permitting the forms to comply with the various

(*Continued on page 40*)

Labor for fabricating a prestressed concrete beam

Work Item	Roebling Method	Prestressed Concrete Corp.	Freyssinet Method	Lee-McCall Method
No. of tendons	3	12	10	16
	Man-Hr	Man-Hr	Man-Hr	Man-Hr
Assembling cage	12	20	20	16
Stripping beam and placing form for next beam	25	25	25	25
Pouring concrete	16.5	16.5	16.5	16.5
Preparing to tension (Remove sleeves and attach cones and cyl.)			4	2
Tensioning	1.5	8	9	2
Retensioning	0.3			1
Grouting	1.7	2.5	2.5	1.7
Total	**57**	**72**	**77**	**64.2**

BEAM FABRICATION begins with the setting of a side form on the casting bed (left). Next, a prefabricated cage of reinforcing steel with prestressing "tendons" inserted was put in place (center), then the other side form, and finally concrete was cast.

skews by simple rotation of sleeve and insert.

After the forms were stripped from a beam—usually just under 24 hr after it was cast—it was measured for length and an initial tension of 50 tons put in the lower tendons. About three hours later, if the test cylinder for the beam concrete showed a strength over 4,000 psi, the full prestress was applied. Meanwhile, concrete was placed for the beam on the adjoining bed. Both beams then were covered and steam-cured over night.

• **Cracks cause concern**—MDPW engineers were distressed at first when they discovered shrinkage cracks near the center of a few of the beams. The cracks developed soon after the members were uncovered; they started at the top and moved down into the web. In no case, though, did they extend to the bottom flange. Since the cracks disappeared when the beams were prestressed, MDPW engineers decided that the members could be used without danger.

One explanation of the cause of these cracks, which occurred during winter weather, is that the top flange cooled much more rapidly than the bottom, causing the beam ends to lift up. The weight of these cantilevers then set up tensile stresses in the upper part of the beam at midlength, causing the cracks. Another possible cause is drying shrinkage. This phenomenon points up the advisability of creating some compressive stress in the top flange when the initial prestress is applied.

• **Lessons on prestressing** – The MDPW also learned some lessons on the handling of prestressing tendons. For example, the high-strength bars for the Lee-McCall method, imported from England, were found to be severely distorted on delivery. Some of these had to be rejected, but most of them were used. (Since then, manufacture of this type of bar has begun in the U.S.; so this condition is not likely to be duplicated.)

Also, the engineers discovered that strands, whether shipped flat or coiled, were received on the job minus their initial stability, which had been induced in manufacture. Hence, MDPW specifications require that strands not only be initially prestretched in the beams but also restressed several days after the full prestress has been applied.

There were lessons also in tensioning and anchoring the tendons. The engineers learned to allow ample room for the swaged fittings on strands so that these larger-diameter parts would not be blocked by the end plates before full stress is applied. They learned, too, the danger of overstressing, and the necessity of applying the tension without eccentricity, since one of the high-strength bars broke at a threaded end while being tensioned. Gages and jacks, they concluded, must be accurately calibrated, and extensions of the tendons checked against the gages.

Incidentally, the failure of the bar initiated an investigation into its properties. These were found to be satisfactory, except that one consultant reported low values in Charpy tests on notched specimens. This result implied brittle behavior, particularly at low temperatures. However, the MDPW decided that this characteristic would not be hazardous for prestressing bars bonded to the concrete.

Wires for the Prestressed Concrete Corp. method also raised some doubts since the pressed-on heads for anchoring them contained numerous splits. The manufacturer pointed out, though, that these were not points of weakness, but merely the normal results of the method of manufacture, with no adverse effect on the strength of the wire. Tests proved the claim; units failed in the testing machine in the body of the wire, not in the heads.

Minor difficulty was encountered also with the Freyssinet method. Some of the wires slipped after they had been tensioned and the conical wedge driven home. When the anchorage was broken open and inspected, the investigator discovered that adhesive tape markers on the wire had been caught by the wedge.

• **Retensioning needed**—MDPW engineers further observed that unless all the tendons were stressed at one time, stressing of succeeding units caused a loss of strength in those already tensioned. To prevent this loss, the first units prestressed must be overstressed initially or restressed after the last tendon has been tensioned. An alternative is to stress the tendons simultaneously with jacks applied at opposite ends of the beam to alternate strands.

• **Preventing and restoring bond**—To prevent the steel from bonding to the concrete before tensioning, the MDPW specified flexible light-gage metal tubing. It could be placed on the wires in the shop and shipped flat or coiled with the units. It could be adjusted easily to the length of the tendons. It permitted bent bars to be inserted without undue difficulty, and it proved satisfactory for use with tendons to be grouted in after tensioning.

On a previous prestressed concrete project, a ¼-in. octagonal thin metal tube with smooth interior had been used to prevent bond. Grout made with equal parts of masons sand and high-early-strength cement had been injected under pressure after the steel was tensioned to establish bond. Test sections indicated the success of that

(*Continued on page 42*)

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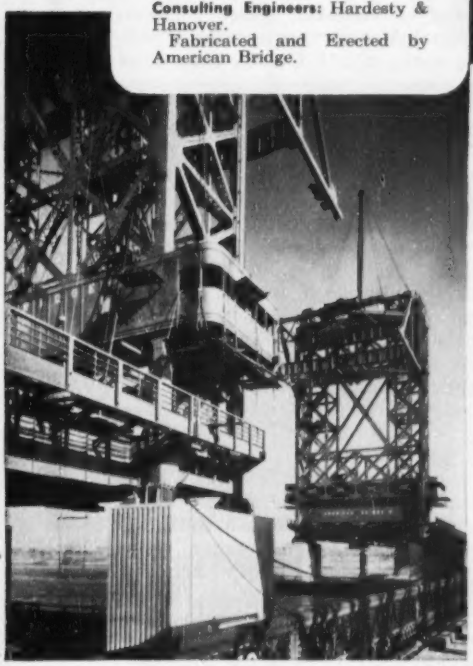

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procedure. But when the same grout was used with the flexible metal tubing, some of the larger particles of sand lodged in the tube corrugations, freezing the pump. The tubing had to be blown out with air and water. To avoid the nuisance, the aggregate was changed to fine engine sand.

Final grouting was done with one part high-early-strength cement, one part sand and eight or more gallons of water per sack, which yielded a grout with the consistency of wet paint. Injection was accomplished with a helical roller pump with rubber stator.

• **Transportation headache**—In addition, there was a lesson to be learned in shipping the beams from casting yard to site. MDPW engineers had assumed that transportation would be simple, but at first that did not turn out to be the case.

Because of the lateral flexibility of the beams, the engineers requested that these members be shipped at least two at a time braced against each other. The Scotland Road beams, which weighed about 20 tons apiece, were loaded with one end of each on a trailer truck and the other on a dolly. Total load was about 75 tons, length of vehicle, 102 ft.

The trucker assumed that the blanket permit for overloads covered these beams. But he was stopped by the state police! And nearly a month was lost before a permit was issued to the contractor to haul the beams two at a time over a new highway. Moral for highway departments: Be sure you can transport your beams before you take bids.

• **Other MDPW projects**—To date, the MDPW has built seven prestressed concrete bridges. (Six of the seven called for I-section beams, substituted for steel I-beams of about the same depth and spacing and designed for composite action under live load with the concrete deck.)

The first contract was let in August, 1951, when only a few prestressed bridges had been built in the U. S. It called for 50 small beams of 27-ft span for a bridge over the Boston and Maine Railroad in Danvers, Mass. Of inverted T-shape, the beams were 14 in. deep and had flanges 12 in. wide. They were erected with flanges butting, and the spaces between were filled with concrete to form a solid slab. Price per square foot of deck, including transportation over 65 miles from casting yard to site, was $7.50, which was greater than for a conventional design.

The next contract called for alternate bids for steel stringers vs prestressed concrete for a 49-ft span in Spencer. The low bidder quoted $13,000 for steel, $17,000 for prestressed concrete. The contract was awarded for the steel design. From this experience, the MDPW learned to avoid alternate designs, to take bids on prestressed concrete designs alone, "because contractors favor in bidding the material and method with which they are familiar."

JOHN C. RUNDLETT, bridge engineer, inspects steel in the deck of a prestressed bridge in Massachusetts.

On the following project—a bridge on Route 128 in Wenham, with two 60-ft spans—the Roebling method of prestressing was specified with no alternate. A contractor bid $2,625 per beam for the 22 beams required—a price 55% greater than that subsequently received for similar beams.

Next followed the four bridges of the experimental Newbury-Newburyport project. The last contract to be let was for 24 beams of 67-ft span, for a structure in Bridgewater on the Fall River Expressway. The same 3-ft section as for the Newbury-Newburyport project, prestressed by the Roebling method, was specified; but the price, nevertheless, was $2,625 per beam, $11.10 per sq ft for the superstructure—about 20% higher than previous comparable bids.

• **New designs foreseen**—These experiences, MDPW engineers believe, indicate a need for reconsideration of the design of prestressed beams, to make the price more competitive. Apparently, prestressed concrete members cannot be substituted directly for steel. To be comparable in cost, prestressed beams may have to be made deeper; and the I-shape may have to be abandoned in favor of the T-shape or box section, with top flanges a part of the roadway slab.

Massachusetts is continuing its work on prestressing. The MDPW will soon take bids on a 4-span continuous slab bridge prestressed with wires wrapped around it (Leonhardt method). The deck will be cast in place and all stressing done at one time.

The prestressed bridges were designed by the Bridge Division of the MDPW, under the supervision of John C. Rundlett, bridge engineer. John A. Volpe is commissioner of public works, and H. Gordon Gray, chief engineer.

Some prestressed bridge costs

As part of a continuing study the Massachusetts Department of Public Works is making of prestressed concrete, John C. Rundlett, bridge engineer, sent a questionnaire to state highways departments. His objectives included determination of the number of prestressed bridges built or planned to date and an estimate of current costs. He received 42 replies.

These indicated that 104 were built or under contract, of which 77 were in Pennsylvania. Furthermore, 41 more were in the planning stage.

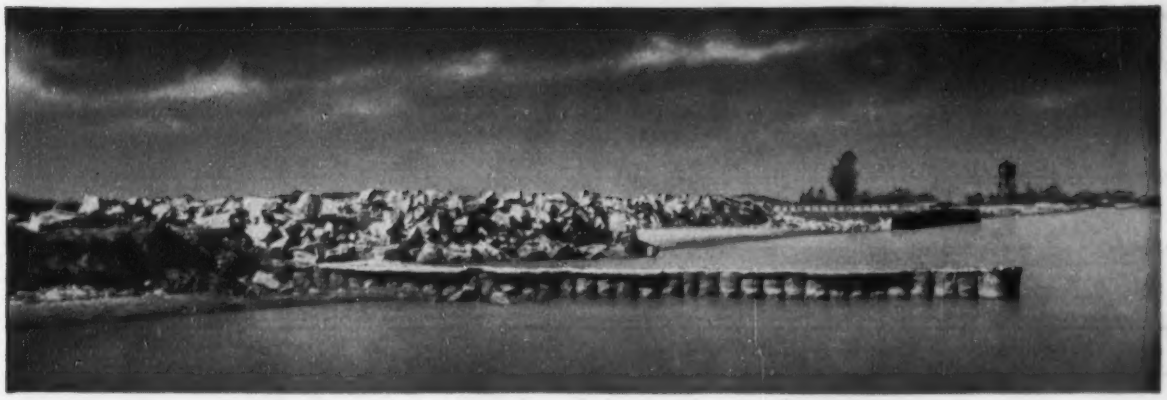
• **Eastern projects**—The first prestressed concrete bridge to be opened to traffic—over Turkey Creek in Madison County, Tenn.—was completed at the end of 1950.

This bridge was built of beams made of concrete block held together by tensioned strands (ENR Jan. 18, 1951, p. 39). The strands had threaded swaged fittings on the ends for end anchorage (Roebling method). Spans were 20 and 30 ft long. Cost of the deck alone, including a cast-in-place slab and curb, was $1.90 per sq ft.

First prestressed bridge to be placed under construction in the U. S. though not the first completed, was the Walnut Lane Bridge in Philadelphia, Pa. (ENR Sept 21, 1950, p. 32). It contained three simple-girder spans—a center span of 155 ft and two end spans of 74 ft each. The girders were I-shape, 79 in. deep, with 52-in. wide flanges. They were prestressed with parallel-wire cables, which were tensioned two wires at a time and anchored at their ends with steel wedges (Magnel method). The bridge, including substructure, cost $32 per sq ft.

Since then, Pennsylvania has kept the lead in number of prestressed bridges built. The newer structures, however, are prestressed slabs, with large hollows (formed by cardboard tubes) to reduce weight (ENR Jan. 15, p. 35). Prestress is applied with strands bonded to the concrete (Hoyer

(*Continued on page 46*)



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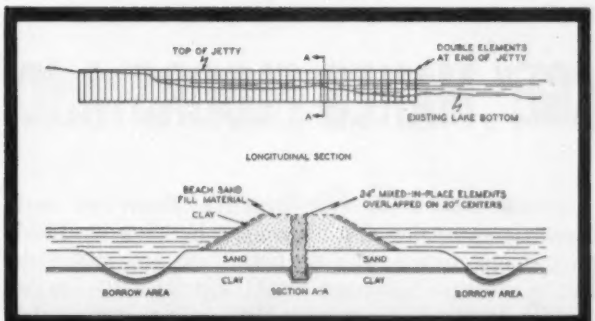

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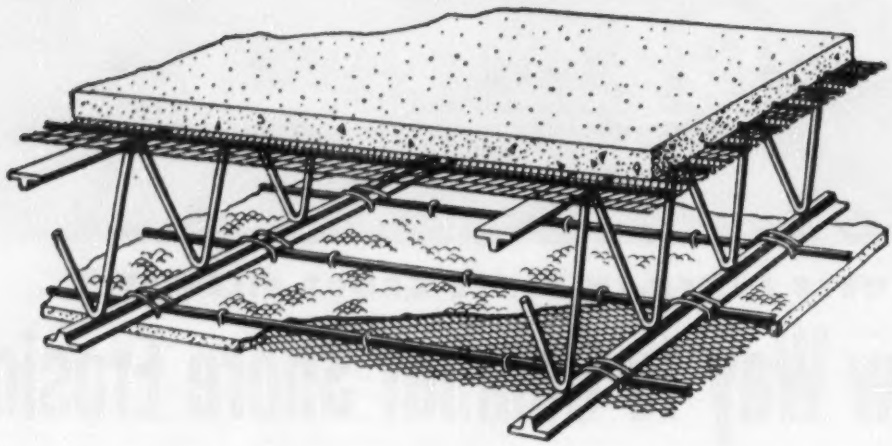

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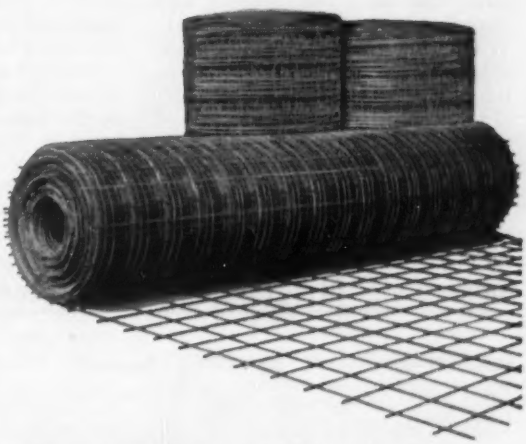

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"long-line" method). As an indication of the growth of prestressing in that state, it may be noted that Pennsylvania built 16 slab bridges in 1951, 31 in 1952 and 30 in the first half of 1953—with spans from 15 to 50 ft. Average cost for the decks in place was about $8.50 per sq ft.

Longest prestressed bridge put under construction to date is the Tampa Bay Bridge in Florida (ENR Feb. 26, p. 37). It will incorporate 363 spans with 47-ft beams and 68 spans with 36-ft unprestressed slabs. With I-shape beams, 40 in. deep, prestressed with end-anchored high-strength steel bars (Lee-McCall method), the deck cost $5.60 per sq ft.

Ohio built its first prestressed bridge late in 1952, at Roseville (ENR Oct. 16, 1952, p. 35). It consisted of five 44-ft T-beam spans. The 30-in. deep beams, prestressed with strands bonded to the concrete, cost $535 apiece. Cost of the superstructure was $8.46 per sq. ft.

First prestressed bridge in New York state was one in Orangeburg, with 62-ft span. Built for the Wyoming County highway department, it was supported on four T-beams, 33 and 36 in. deep. The beams were prestressed with parallel-wire cables that were end-anchored with conical wedges (Freyssinet method). With a 7½-in. thick roadway slab, the superstructure cost $7 per sq ft. More recently, six bridges have been built of shop-precast units, field assembled with tensioned cables. Decks for the shorter spans cost about $2.20 per sq ft.

Maryland has built one bridge of this type—on Shawan Road on the Baltimore-Harrisburg Expressway. Nine beams of 100-ft span, prestressed by the Freyssinet method, were required. The superstructure cost $15.90 per sq ft.

Kentucky is building a 93-ft bridge costing $26.45 per sq ft. The prestressed beams cost $215 per cu yd.

Connecticut built its first prestressed bridge in 1953—on the Hartford-Glastonbury Expressway. It has a span of 52 ft 6 in. Girders are T-shape, 30 in. deep, prestressed by the Freyssinet method. Cost of the deck ran about $14.70 per sq ft—double the engineer's estimate.

The District of Columbia is constructing a prestressed bridge over the Oxon River with a span of 75 ft. The nine beams are rectangular in shape, 3x3.3 ft, with 2-ft dia hollow core, and are prestressed by the Freyssinet method. Cost of superstructure is $9.68 per sq ft.

• **Western projects**—At Denver, the Colorado highway department has built a bridge over the Platte River with four 50-ft spans. Beams have a modified octagonal shape, are 3 ft deep and 3½ ft wide, with a 21-in. hole in the center to reduce the weight. They are prestressed by wires bonded to the concrete. Cost of fabrication and erection of the beams and a prestressed deck was $5.10 per sq ft.

Oregon has let a contract for a prestressed bridge over Willow Creek on the Columbus River Highway. It has three 98-ft spans, each consisting of five 5½-ft deep girders of modified I-shape prestressed by the Freyssinet method. Cost of the superstructure averages about $8.50 per sq ft.

Oregon also is building a prestressed bridge with four 60-ft spans and four 45-ft spans. Each span consists of seven I-beams prestressed by the Lee-McCall method. Cost for the superstructure is $7.50 per sq ft, and for the entire bridge, $15.11 per sq ft.

California has completed two bridges – Arroyo Seco Pedestrian Bridge (ENR May 10, 1951, p. 40) and Weber Ave. Bridge, in Fresno. The Arroyo Seco crossing has a span of 110 ft, carried on two 68-in. deep girders. These were prestressed with wires with pressed-on heads for end anchorage (Prestressed Concrete Corp. method). The Weber Ave. Bridge, built in 1953, required ten 36-in. deep beams of 67-ft span, which were prestressed by the Freyssinet method. Cost of the deck was $9.38 per sq ft.

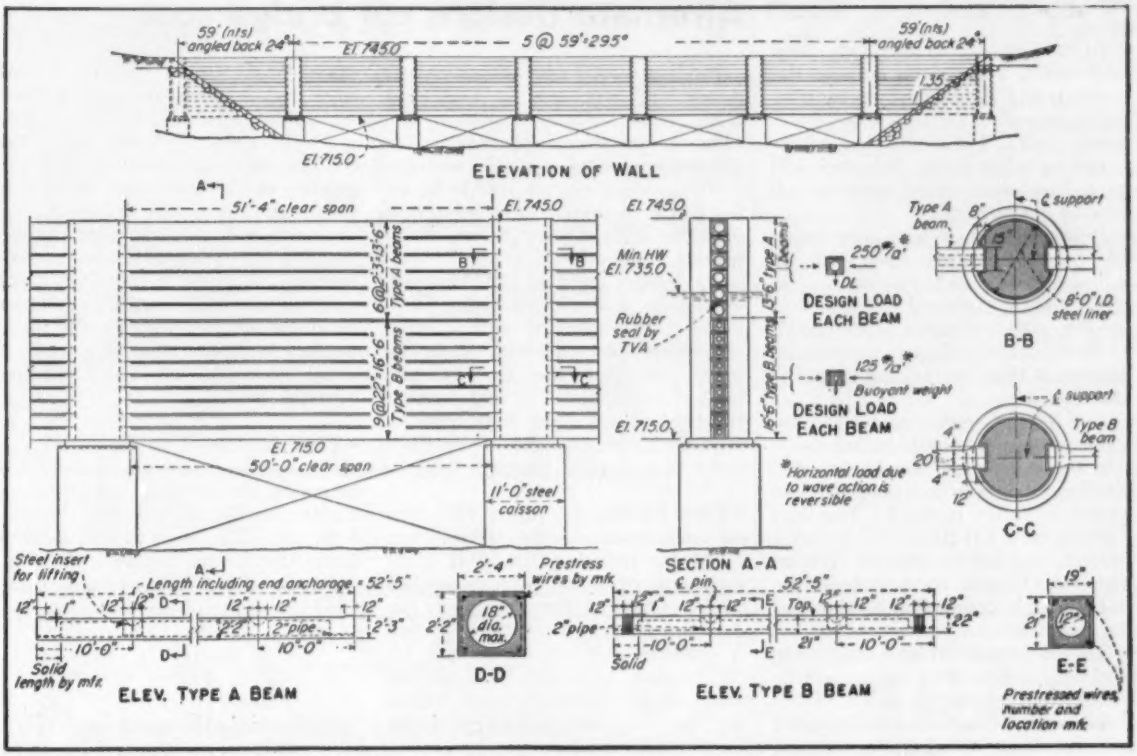
Since this bridge was started, California has put under contract two more pedestrian bridges and one highway bridge. It also has in the design stage five others, one of which is continuous, with spans up to 100 ft.

Texas has built a multispan trestle over the San Bernard River. It consists of 23 spans of 30 ft and one of 54 ft, with T-shape beams prestressed by the Roebling method. The superstructure cost $5.33 per sq ft.

It is noteworthy that although the costs of the bridges have been given in terms of square feet of roadway, the figures may be of little value for making comparisons to determine the relative economy of prestressed concrete and other materials. What is more significant is that in many cases, bids were taken on alternate designs, and the low bid was for prestressed concrete.

Summary of bridge superstructure costs

Name	Location	Date Built	Spans—Ft	Method	Cost per Sq Ft
Turkey Creek	Madison Co., Tenn.	1950	20–30–20	Roebling	$ 1.90
Tampa Bay	Florida	1953	36–47	Lee-McCall	$ 5.60
	Pennsylvania	1953	15 to 50	Hoyer	$ 8.50
	Roseville, Ohio	1952	44	Pretensioned	$ 8.46
	Orangeburg, N. Y.	1951	62	Freyssinet	$ 7.00
	New York	1953	Various	Freyssinet	$ 2.20
Shawan Road	Maryland	1953	100	Freyssinet	$15.90
	Connecticut	1953	52	Freyssinet	$14.70
Atlantic St.	District of Columbia	1953	75	Freyssinet	$ 9.68
Platte River	Denver, Colo.	1953	50	Freyssinet	$ 5.10
Willow Creek	Oregon	1953	98	Freyssinet	$ 8.50
	Oregon	1953	45–60	Lee-McCall	$ 7.50
Weber Ave.	Fresno, Calif.	1953	67	Freyssinet	$ 9.38
San Bernard River	Texas	1953	30–54	Roebling	$ 5.33
Scotland Road	Massachusetts	1953	65	Roebling	$10.00
Hale St.	Massachusetts	1953	64	Freyssinet	$ 9.60
Storey Ave.	Massachusetts	1953	58	Lee-McCall	$ 8.50
Pine Hill Road	Massachusetts	1953	59	Prestressed Concrete Corp.	$10.60
Danvers	Massachusetts	1951	27	Roebling	$ 7.50
Bridgewater	Massachusetts	1953	67	Roebling	$11.10
Wenham	Massachusetts	1952	60	Roebling	$13.75



A structural design, for an hydraulic effect, with a thermodynamic purpose . . .

Skimmer wall to catch cooler cooling water

TVA devises novel gate for steam-station intake channels, only water off reservoir bottom will squeeze underneath

A gated structure designed to skim 90 degree surface water in summer and pass a bottom flow 15 or more degrees cooler will be built across the intake channels of two Tennessee Valley Authority steam-power plants (ENR Feb. 25, p 30).

Both the Kingston and Gallatin plants will make use of this novel temperature-control device. Kingston is on the Emory River embayment of Watts Bar Reservoir; Gallatin will be on a Cumberland River lake to be formed behind Old Hickory Dam, now under construction by the Corps of Engineers east of Nashville.

Involved in the skimmer wall design is the hydraulic phenomenon of density currents (ENR Dec. 17, 1953, p 31). Water in reservoirs stratifies according to temperature during summer months; then its flow is governed largely by its graduated density—the lower, cooler water naturally being the more dense.

The problem for the designers was to devise an intake that would bring in 75 F water from reservoirs with a summer surface temperature near 90 F. The big question: Will a bottom intake continually draw water off the bottom, or will warm surface water be pulled down through it?

TVA asked MIT. And a model study completed under Prof. Arthur T. Ippen in the Massachusetts Institute's new hydrodynamics laboratory gave the answer: Density will govern flow; warm surface water will be skimmed and only the cooler bottom flow will pass beneath the wall.

• **Design of the wall**—Structural design is straightforward, and skimmer walls at the two steam stations will be essentially alike. The Kingston construction is discussed here as being more interesting—and perhaps more typical of what might apply to most other plants—in that it must be accomplished in fairly deep water. (At Gallatin the wall will be built in the dry; a dike on the bank of the Cumberland acts as a plug, to be pulled when the intake work is completed.

Essential details of the Kingston skimmer wall design appear in the drawing. There are seven 30-ft high curtain walls between piers on 59-ft centers. Each wall consists of 15 prestressed concrete beams, stacked with rubber seals between. And below the walls are openings roughly 15 ft high through which will flow the million gallons per minute required to cool the mammoth (1,600,000-kw) Kingston steam plant.

• **Construction method**—Placing the 11-ft dia caissons for the piers in 35 ft of water will follow this procedure:

Rock surface at the caisson location will be jetted and scraped clean; the caisson will be lowered and positioned by barge crane. Tremie concrete will be poured to effect a seal from the rock surface at El. 700 to about El. 714.

The steel caisson will have inside pipe accessories for leveling and for anchoring. Four 6-in. dia pipes at the quarter points will act as guides for core drilling four 3¼-in. holes a minimum of 15 ft into foundation rock. Then there are 2-in. extra strong pipes to be lowered to within 3 in. of the bottoms of these drill holes for anchoring the piers to the rock. Grout will be pumped through the 2-in. pipes to fill the 3¼-in. holes and 6-in. dia guide

(*Continued on page 48*)

pipes to an elevation above the tremie seal.

After tremie concrete and grout have cured, the caisson will be unwatered, and eight more 3½-in. core-drill holes will be sunk 15 ft into foundation rock. These will be equally spaced on a 9-ft circle. Into each will go a 2-in. extra strong pipe for additional anchorage.

Inside this 9-ft circle of grout holes, 14 3-in. dia dowel holes will be drilled 6 ft deep in a symmetrical pattern (a circle flattened to clear slots for the gates on either side). Next, 1¼-in. square dowels will be set and grouted in these holes, projecting 4 ft above.

The 8-ft dia steel liner for the finished wall support will be set down into the caisson. It will be centered and have its beam slots properly positioned by survey methods. The liner will rest on a 1-ft thick, 9-ft diameter concrete pad poured atop the tremied concrete. It will be bolted to the pad through connection angles and the joint will be calked.

The steel liner will have reinforcing steel attached inside; concrete will be poured in three lifts up to El. 745.

With the 8-ft diameter wall-support completed on its 11-ft dia tremied base, the 11-ft caisson will be filled with water up to the outside water surface level, then burned off at El. 714.2. This is just above the top of the tremied base.

All the wall-supports in this Kingston skimmer wall are alike. Exceptions to this are the two supports next to the ends (Nos. 2 and 7). Instead of having beam slots 180 degrees apart, these two have them about 160 degrees apart to take care of a 20-deg bend in the structure at those points.

Prestressed concreted beams to be dropped into the slots to form curtain walls are all to be cast with steel pins set in for handling (see drawing).

As indicated above, the wall to be built across the intake channel at Gallatin steam plant will be of nearly identical design with the one at Kingston. However, as the Cumberland River has not as yet been let flow into the intake channel at Gallatin, the construction operation there will be executed in the dry, and therefore by more conventional construction methods. The Gallatin plant will not need water until late in 1955 when its first unit is to go on the line; Kingston, on the other hand, recently fired up the first of its nine boilers.

A. A. Meyer is head of TVA's civil design branch, which designed these skimmer walls and prescribed the construction procedure. Albert S. Fry handled hydraulic research and development as chief of the authority's hydraulic data branch.

Alternate designs cut bridge cost

Bidding on a 1,450-ft long viaduct across Exchange Ave. in Oklahoma City, Okla., clearly indicated the value of prestressed concrete as an alternate in bridge construction.

The existing viaduct had to be rebuilt to accommodate the heavy flow of traffic from Exchange Ave. Engineering studies by William T. Wishart, bridge engineer, of Hudgins, Thompson, Ball and Associates, Oklahoma City, indicated that existing piers were adequate with slight repairs, but that the superstructure needed replacing. The old viaduct consisted of seventeen 40-ft spans of reinforced concrete, and eleven 70-ft spans of steel plate girders.

• **First bidding**—In July, 1953, bids on reconstruction were taken. Plans called for replacing the 40-ft spans with one of three alternates—rolled steel sections, reinforced concrete girders or prestressed concrete girders. A concrete slab was to be cast for the roadway. For the 70-ft girders, plans called for removal, repair, stiffening, painting and replacing of the existing plate girders.

The engineers' estimate for this construction was $625,000. When the bids were opened, it was found that all bids were over the estimate and the job was re-advertised for bidding in October.

• **Second bidding**—For the October letting, plans were changed slightly for both the alternate and the base bid. The 40-ft spans were redesigned in prestressed concrete, as were the 70-ft spans. For the steel, the same design was used as in the first bidding, but the 70-ft spans were altered to include only painting of the existing plate girders and the addition of two plate girders per span. The engineers also allowed prestressed-concrete design alternates, provided they met the engineers' prior approval.

When bids were opened it was found that the following total costs resulted:

1. J. C. Saunders Construction Co. Steel construction $599,319.36
2. Guy H. James Construction Co. Prestressed concrete (with Prestressing, Inc., of San Antonio, as subcontractor) $599,803.43

In the breakdown of these bids, the following cost items are of interest:
Bid (1) structural steel in place
1,623,746 lb @ $0.12 = $194,849.52
Bid (2) prestressed concrete beams
81,891 sq ft @ $3.16 = $258,775.56
The last item actually included the entire bridge deck because beams were tee sections butting together. An asphalt wearing surface was added.

The difference in bid price was $485.07, less than one-twelfth of one percent of the total cost. With this in mind, the design engineer, city engineer and city manager recommended acceptance of the prestressed-concrete alternate because of lower maintenance costs, earlier completion date and use of local labor and materials. However, the city council voted to void all bids and re-advertise.

• **Final bidding**—The prestressed-concrete alternate was changed to incorporate the alternate submitted by Prestressing, Inc. In this plan, T-beams form the bridge deck as well as serving as longitudinal beams.

Results of bid opening on Dec. 22, 1953, were as follows:

1. J. C. Saunders Construction Co. Steel $559,137.81
2. Imperial Paving Co. Prestressed concrete . 573,803.38
3. Suddreth Construction Co. Steel 584,056.00
4. Boecking Construction Co. Steel 587,773.73

Interesting unit prices on the steel bids reveal the following:

	Bid (1)	Bid (3)
Structural steel (1,623,746 lb) per lb	$0.0925/#	$0.15/#
Repaint & reuse existing steel 700 tons (L.S.)	$25,000	$30,000

From the above, the following facts become apparent: If the entire superstructure were to be replaced with new structural steel at the unit price bid, the following amount would have to be added to the low bid price:

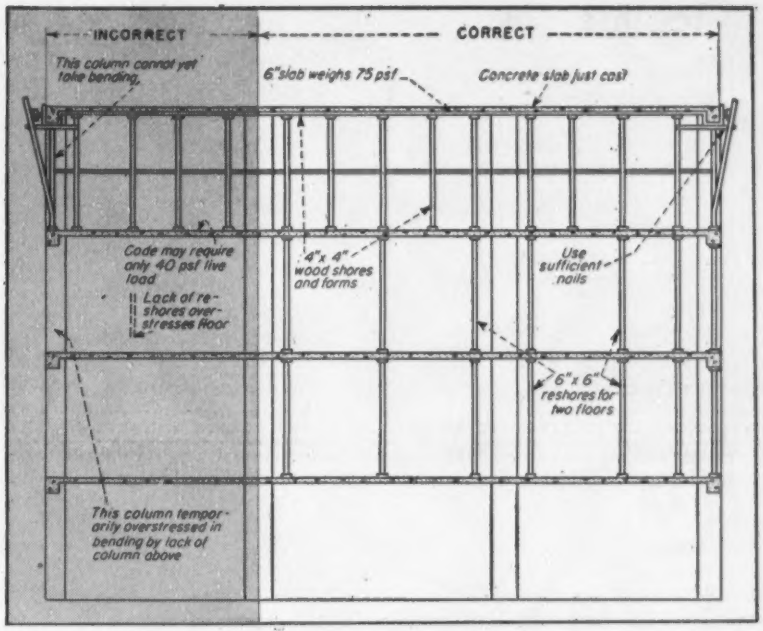
700 tons @ $185.00	$129,500
Less (for reuse of existing steel)	25,000
	$104,500

This would give a total bid price on the low steel bid of

	$559,137.81
	104,500.00
	$663,637.81

This bid would have exceeded the engineers' estimate substantially. The same analysis of the other steel bids would result in even higher prices. In contrast, all four bids submitted for the prestressed-concrete alternate were below the engineers' estimate.

By using an alternate prestressed-concrete design, the engineers apparently were successful in obtaining a structure costing $66,000 less than their estimate.


INCORRECT
CORRECT
This column cannot yet take bending
6" slab weighs 75 psf
Concrete slab just cast
Code may require only 40 psf live load
Lack of reshores overstresses floor
4" x 4" wood shores and forms
Use sufficient nails
6" x 6" reshores for two floors
This column temporarily overstressed in bending by lack of column above

FATAL MISTAKE in flat-plate construction is to forget to reshore a floor slab after forms are stripped (left). Often, two stories should be reshored (right).

Pitfalls in flat-plate construction—and how to avoid them

This new type of concrete construction can be used safely if competent design and inspection practices are followed

Stephen D. Teetor
Seelye, Stevenson, Value & Knecht
Consulting Engineers
New York, N. Y.

Accompanying the recent trend toward flat-plate reinforced concrete construction for multi-story buildings have been several failures during erection and numerous cases of severe cracking after structures have been in service only a short time. Investigation of these projects revealed that in all cases the damage could have been prevented by following good design and construction practices.

In flat-plate construction, floors and roof generally consist of a thin slab supported only by columns. It differs from flat-slab construction in that thickening of the slab around the columns to form drop panels, and enlargement of the column tops, frequently are omitted.

When properly designed and built, flat-plate buildings have proved to be less costly to construct than other types. Cast in plywood forms, the concrete may be painted on the underside to form a ceiling, thus eliminating the need for plaster. The upper side, given a monolithic finish, requires no fill or additional finish. In comparison, a conventional steel-frame design calls for fill, finish and plaster ceilings, while the usual beam-and-slab concrete construction requires more complicated formwork.

There are, however, many pitfalls in the design and erection of flat-plate buildings. Some of those that have caused trouble in the past and suggestions for avoiding them are outlined in the following:

• STRESS ANALYSIS

Pitfall—Empirical coefficients are available for computing bending moments in certain types of slabs. Generally, these coefficients were developed for simple types of slab: regular column spacing, usual story heights, drop panels and column capitals. To apply the empirical method to more complex flat plates with irregular column spacing may lead to dangerous design errors, particularly for moment resistance of exterior columns.

Safeguard—With a complex structure, only an experienced, capable engineer can produce a satisfactory, safe design. Such an engineer should be backed up by an expert checker who not only can check the calculations, but also the theory of the whole design, which may require rigid-frame analysis. In every case, the designer must be certain that the laws of equilibrium are satisfied.

• REINFORCING BAR DESIGN

Pitfall—Sometimes, reinforcing steel at the bottom of a slab is not extended into supporting columns, or only a short lap is provided between top and bottom bars. Either practice is inherently dangerous, because it is possible to draw a so-called "fatal line" from top to bottom of the slab without encountering any reinforcing steel. There, a crack might form and spread with little resistance.

Safeguard—At the very least, alternate bottom bars should be extended into the columns or carried through into the next panel. Or alternate bottom bars might be bent up, to serve as top bars in negative-moment sections.

• SLAB DEPTH

Pitfall—In thin plates with a large amount of negative reinforcing, the danger exists of not developing the effective depth assumed in the design. For example, if the effective depth of a 6-in. slab is supposed to be 5 in., but the top steel is placed 2 in. too low, the actual effective depth is only 3 in. As a result, the resisting moment of the steel will be much less than assumed in the design, and severe cracking, possibly failure, might occur.

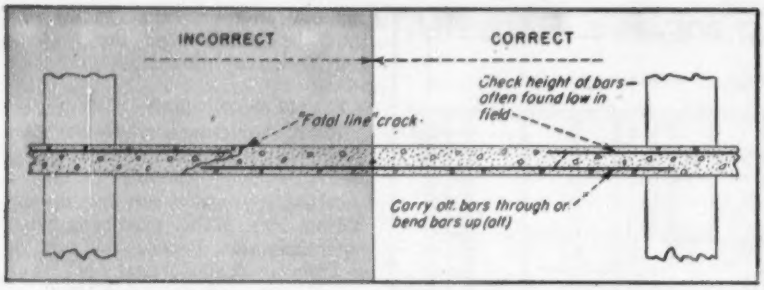
Safeguard—Designers and detailers must be certain that the top steel will not be placed in several layers, without accounting for the reduced effective depth of the lower layers in design calculations. Inspectors must see that steel is placed in the concrete at the proper elevation.

• SHOP DRAWINGS

Pitfall—Shop drawings usually are subcontracted by a contractor and often detailed with a contingency of credit for weight saving by shortening the steel. (This credit, according to current rumor, is about $50 per ton saved.) In almost all cases, there is a motive for the detailer to make himself popular with the contractor, his client, by keeping steel tonnage down. Some of the methods of saving steel, such as cutting alternate bars short in areas of low bending moment, while satisfactory from a theoretical viewpoint, often complicate the method of placing reinforcing and require more vigilant field control to avoid trouble. One example of a poor method of saving steel is shown in the sketch on p. 52.

Safeguard—Designers should check bar schedules and shop drawings carefully, as well as the placing of reinforcing in the field.

(Continued on page 50)


INCORRECT
CORRECT
Check height of bars—often found low in field
"Fatal line" crack
Carry all bars through or bend bars up (all)

FAULTY SLAB DESIGN fails to lap top and bottom bars sufficiently. A crack can form and spread unresisted by steel reinforcing bars.

• FIELD INSPECTION

Pitfall—For many structures, an engineer is engaged only to make a set of design plans. The field follow-through is left to the various participants, such as the general contractor, reinforced concrete subcontractor, testing laboratory and in some cases, the architect's field representative. This is done because the engineer's field services are looked upon as an added cost, though actually the cost of correcting mistakes that he might have prevented may be many times greater.

It may be noted that when a contractor decides what portion of the work he will have engineers inspect, he is administering engineering, although he may not be a licensed engineer. Furthermore, when a contractor engages and pays the salaries of inspectors, they are somewhat under obligation to him.

Also a poor practice is that of some laboratory personnel who sell owners or architects the idea that they can inspect reinforced concrete without the engineer's control. Reinforcing steel must be checked by a man qualified in reinforced concrete design; there is no sense in having "the blind checking the blind."

Still another bad practice is to leave field inspection of concrete construction to the architect's superintendent. No matter how capable he is, rarely does an architect's representative possess a knowledge of reinforced concrete design and mechanics. Therefore, he is not capable of catching certain errors of execution in the field. The details from which he is working may be inadequate, with the result that bars may be incorrectly placed or be short at critical points of stress in the slab.

Safeguard—Field follow-through is an important part of the engineer's service. A conscientious engineer should insist on his being retained for that purpose. In addition, field inspection should be done by an engineer who is both qualified as a designer and versed in field work. Such an engineer sometimes may pick up an undesirable condition in the plans that may have been overlooked by the office engineer.

• HOW MANY FIELD INSPECTORS?

Pitfall—A lone inspector would need more faces than Janus if he were asked to supervise setting of reinforcing bars, placing of concrete in the forms, curing and cold-weather control, checking the slump test and taking of control cylinders and to see that floor finishes are made properly, that slab depths and column sizes are correct, that sleeves and opening dams are in place, and that reshores are adequate and not removed too soon. On one job we investigated to discover the cause of concrete cracking, we found steel had been omitted from a floor slab, leaving a band of plain concrete clear across the building.

Safeguard — Sufficient inspectors should be hired so that proper attention can be given to all the details that require inspection.

• CONCRETE CONTROL

Pitfall—The trend in flat-plate design has been toward high-strength concrete, to keep slabs thin. High strengths, however, can be assured only by scientifically designed mixes. An omission of or mistake in any of the ingredients, too much or too little mixing, or failure to adjust for such conditions as variations in moisture in the aggregate, change in aggregate gradation, variation in plant mix and unauthorized use of air-entraining cement can lead to serious troubles. It should be noted, for example, that substitution of $\frac{3}{8}$-in. aggregate for $\frac{3}{4}$-in. can reduce the strength of 2,500-psi concrete to 1,800 psi.

Superintendents of ready-mix plants often are paid on a profit-sharing basis; so that in their efforts to maintain a high output, they have an incentive to sacrifice quality control for speed.

Furthermore, in some locations, aggregates are available that produce unsatisfactory concrete, and sometimes political and economic pressures are brought to bear on contractors to use them.

Safeguard—An inspector at the batching plant is vital to the production of high-strength concrete. He is needed not only to watch the scales to insure full weight but also to see that proper aggregates and cement are used and that adjustments are made to correct variations in materials that might affect concrete strength. In addition, the concrete should be tested to verify that specifications are being met. Above all, plant control should not be left to a laboratory hired by the contractor or the plant.

• TEST CYLINDERS

Pitfall—There is danger in permitting a contractor to make his own test cylinders. These are manufactured on the job with a prescribed number of strokes of a bar of a size specified by the American Society for Testing Materials. The cylinders must be kept under prescribed conditions of temperature and moisture in handling, storing and shipping. A variation from specifications will lead to erroneous results.

Often, cylinders apparently made from defective concrete will test satisfactorily. One reason for this is that, to facilitate placement in the forms, water was added to the concrete after the cylinders were made.

Safeguard—Cylinders should be taken only by competent test engineers employed by a reliable testing laboratory—and the cylinders should be selected and made under the supervision of an experienced field inspector employed by the engineer.

• CEMENT TESTING

Pitfall—State and federal authorities require that mill tests of cement be made and the shipment sealed so that inspectors can see that the material has been tested. At the present time, the ordinary buyer cannot have this done, on the specious excuse that the volume of purchase is not large enough.

Safeguard — One protection the buyer now has is to take random samples for testing. However, the time element is a major disadvantage in that case; for the cement probably would be incorporated in the structure before the tests are completed. A better solution would result if the ready-mix companies would insist on accepting only sealed, tested shipments and allow inspectors access to the bins in which they are stored.

• SHORING AND RESHORING

Pitfall—Deadweight of a flat-plate floor often exceeds the live load for which it was designed. So the slab generally cannot be relied on to support without assistance the weight of forms and newly cast concrete for floors or roof above. Frequently, also,

(*Continued on page 52*)

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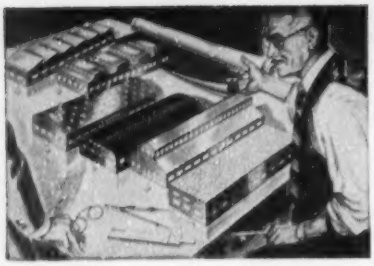

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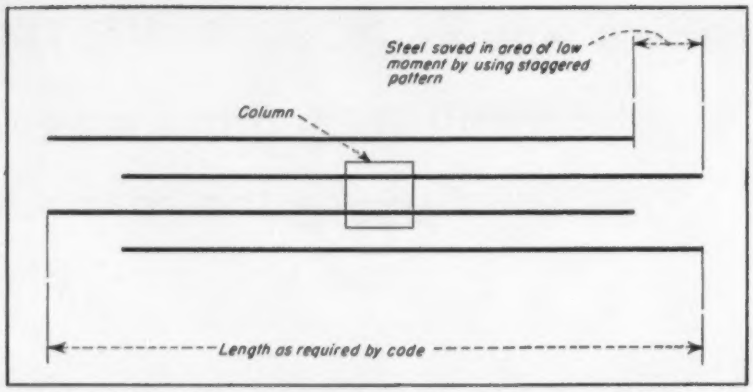

STAGGERING BARS in a slab to save steel may prove false economy. Field inspection is complicated; lathers may omit stagger, in which case bars are too short.

even though design loads may exceed the weight of forms and newly cast concrete, the floor below, to which the forms are shored, may have been cast too recently to have gained design strength.

Safeguard—When forms are stripped, the slab should be reshored to the floor below. Generally, at least two stories of shores should be used for adequate support. The inspector should not only make sure that this is done but also that reshores are left in place until the design strength of the concrete has been reached and high construction loads removed.

• SCOPE OF BUILDING DEPT.

Pitfall—In small communities, the building inspector seldom is a qualified engineer with experience on structurally complex jobs. In large cities, the building department is too busy to give such jobs the attention required. This emphasizes the danger of relying on building departments to catch mistakes in plans or field work.

Safeguard — Municipalities should revise their building codes to:

1. Adopt by reference the latest editions of specifications and building codes of such organizations as the American Concrete Institute and the American Institute of Steel Construction.

2. Require architects or engineers who prepare plans to submit an affidavit certifying compliance with the building code. The building inspector should check to insure compliance not only with the code but also with other perinent laws or ordinances. If the structure is complicated, he should be empowered to employ, at his own discretion a licensed engineer qualified in this specialty, to check the plans, cost to be borne by the owner, but not to exceed say, ¼ of 1% of the construction cost of the building. If a consultant is not engaged, the building inspector should be held fully responsible to the municipality and other authorities for errors or omissions in the plans.

3. Authorize the building inspector to employ a licensed engineer for field inspection of complicated structures. For reinforced concrete, this inspection should include placement of reinforcing steel, control of the concrete and shoring operations. Cost should be borne by the owner, but not to exceed, say, $2.50 per cu yd of concrete placed.

4. Require the supervising engineer to submit an affidavit certifying that the work has been carried out in accordance with the plans and the law. If a consultant is not engaged for inspection, the building inspector should be held fully responsible to the municipality and other authorities for errors or omissions.

• ALL TYPES OF CONSTRUCTION

Certain practices are wise to follow not only for flat-plate buildings but for all types of construction. For example, all architect-engineer services—checking of plans and field inspection—should be eliminated from competition on the basis of price. Neither should engineers be engaged by a contractor or other firm whose work they are to check. Testing laboratories and engineers should not be placed in a position where they are obligated to contractors and others who might be interested in "cutting corners."

In particular, owners should assure themselves of the quality of contractors and subcontractors. Because of the possibility of heavy losses if a building should collapse, it might be well also to require a performance bond.

As a final note of warning, insurance companies should beware of doing business with contractors with poor qualifications.

Elwyn E. Seelye and Philip P. Page, Jr., of Seelye, Stevenson, Value & Knecht collaborated with the author in the preparation of this article.

Write for these technical data books from H. H. Robertson's Q-Floor library

How to fireproof Robertson Q-Floor and Structural Steel

This booklet is an exposition of fireproofing methods employed when Q-Floor is used in conjunction with structural steel framing in a multi-story building and must meet local building code requirements. It covers most problems likely to be encountered by the designer and contains charts of typical code requirements, fire resistance ratings, and framing and ceiling details, both basic and with all combinations of extras.

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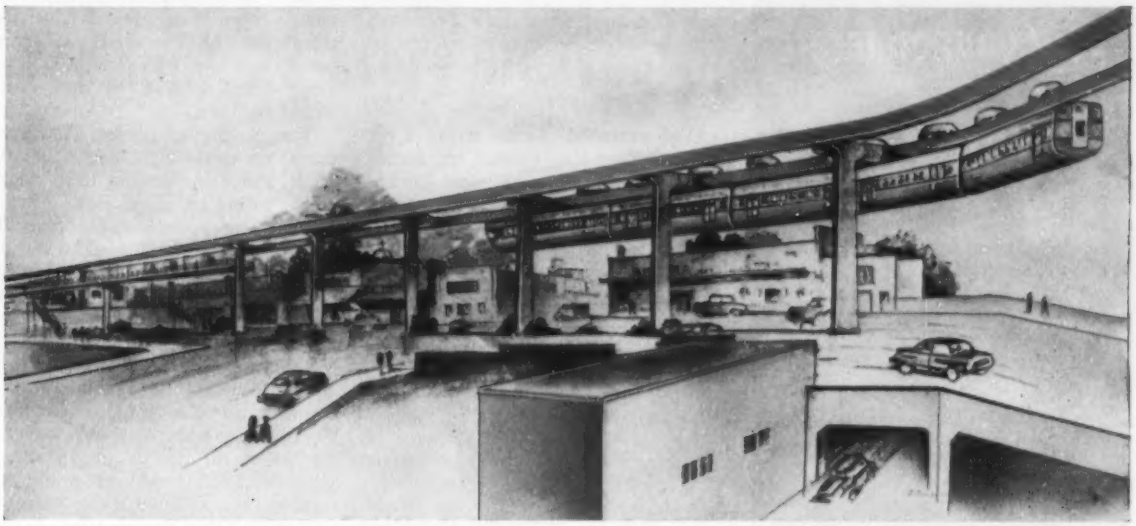

A MONORAIL FOR LOS ANGELES could be the solution to the city's traffic snarl if recommendations are followed.

Would monorail rapid transit work? Engineers' report proves favorable

It's at least a possibility that this year will see the active beginnings of the country's first monorail system—in Los Angeles, where monorail has progressed from a hazy dream to a definite proposal that can be, and is being, fought over.

Actual construction of the system depends on whether California's Governor Goodwin J. Knight is persuaded to put monorail on the agenda for the special session of the legislature this month, whether the legislature can be persuaded to pass two highly controversial measures, and on whether investors can be found to take up $165 million of revenue bonds.

The monorail picture has been brought into arguable focus by issuance of a report on a 10-month study by Coverdale & Colpitts of New York City, with the collaboration of Ruscardon Engineers, Los Angeles, and Gibbs & Hill, New York. The study was undertaken for the Los Angeles Metropolitan Transit Authority, an agency established by the state legislature in 1951 to investigate monorail, and to build and operate a monorail system if found to be feasible.

• **Report is favorable**—Outlined is a 45.7-mile route between the San Fernando Valley and the city of Long Beach, via downtown Los Angeles, giving the line a strong recommendation as a reasonable attack on Los Angeles' transportation problems. The report sees monorail as economically feasible—with two important if's.

• To be able to retire its debt in a reasonable time and to attract investors, the line must have substantial tax relief.

• It must be able to set its own fares and operating conditions without regulation by the State Public Utilities Commission.

• **Opposition**—Both of these recommendations inevitably set off a loud howl from private transit operators. Largely due to their influence, the original act that established MTA specifically states that, if and when a monorail system is established, the authority is to be treated exactly like private transit companies.

The private operators say that anything else would be grossly unfair—all transportation agencies are public services, and all should be treated alike.

The authority argues that public corporations are always tax exempt, and it points to the California Toll Bridge Authority and the Chicago Transit Authority as evidence of the general recognition that such agencies, in order to attract investors to revenue bonds, must have complete control of their own rate structure.

So far, the authority is doing most of its own fighting. Neither the city nor county of Los Angeles has taken an official stand, nor have the Los Angeles Chamber of Commerce and other influential groups. The city and county have joined forces in setting up a 45-man committee to study the whole traffic and transportation question, including the monorail proposal.

• **Report highlights**—In its argument for monorail, the report points out that Los Angeles, unlike any other major metropolitan area, grew up in the auto age, with a consequent tendency toward dispersion. In the 1950 census, Los Angeles County has a population density of only 1,020, as compared with an average of 30,591 for the counties in the New York metropolitan area, 16,012 for Philadelphia County, 16,302 for Suffolk County, Massachusetts (Boston), and 4,726 for Cook County, Ill. (Chicago).

Conventional surface public transportation is not the answer, the report indicates. Patronage on the Los Angeles transit lines dropped from a peak of 439,812,000 in 1947 to 256,947,000 in 1952. Total revenue passengers on the Interurban Pacific Electric Railway (now Metropolitan Coach Lines) dropped from a peak of 177,823,000 in 1945 to 92,475,000 in 1952.

The solution, says Coverdale & Colpitts, will be found in subways, elevateds, or monorails. Subways are ruled out as prohibitively expensive to build. Elevated railways are too objectionable to abutting property own-

(*Continued on page 56*)

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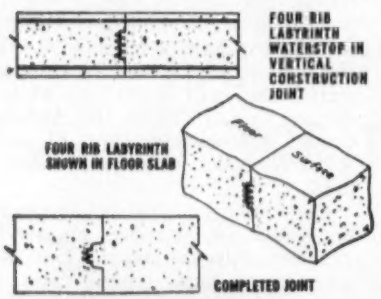

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ers, although the report points out that they could be made a good deal less so than systems now operating, and recommends some consideration of an elevated as an alternative to monorail.

• **High potential**—By the terms of the legislative act that created the transit authority, the engineers were limited to consideration of a specific area—"the entire San Fernando Valley west of the west boundary of the city of Glendale, and within four miles on each side of the main channel of the Los Angeles River from San Fernando Valley to the mouth of the river at Long Beach."

Within this area, the engineers laid out the route, which they believe would make a logical beginning to a county-wide system. The "study area" contains 50.3% of Los Angeles County's population. The line would connect two major residential areas (San Fernando Valley is the fastest growing region in the county) with downtown Los Angeles and with important industrial areas. And the engineers believe the line would draw passengers from considerable distances on either side of it, fed by surface public transportation and by private autos.

The 45.7 miles would be elevated except for a 2-mile subway section in mid-town Los Angeles. There would be 17 stations on the line, at intervals averaging 2.8 miles. All stations—except three, the two in mid-Los Angeles and the one at the southern terminus in Long Beach—would have adjoining parking lots.

• **High speed**—Major advantage for the system would be speed. Trains would reach 60 mph between stations, and would average 41 mph including 20-second stops—faster than any existing urban or interurban transit system. From downtown Los Angeles to Long Beach, the existing rail transit schedule is over an hour; by car, when the Long Beach Freeway is completed, it will take an estimated 55 minutes; by monorail, 37 minutes.

• **Low long haul fare**—Fares could be competitive with travel by auto and by surface transit, Coverdale & Colpitts believes. The line has been divided into three zones—northern, central, and southern. Fare within the northern and southern zones would be 25¢. Within the central zone it would be 20¢. A trip from either the northern or southern zone to the central zone would cost 35¢. From one outer zone to the other would be 50¢. Shorter rides would cost somewhat more than present transit facilities (which now charge single-zone fares of 15¢); long rides would be substantially less (present transit fare from Los Angeles to Long Beach is 63¢; by monorail it would be 35¢).

The preliminary design study contemplates light-weight cars suspended 16 ft. above the ground from double trucks riding on single rails. All propulsion equipment would be in the trucks, operated from control stations in the front of the cars. The cars would be approximately 50 ft. long and seat 67 persons.

• **Structural advantages**—Support for the rails would be a single row of columns in the center of private rights-of-way where available, or as an alternative, in the middle of streets. Upper end of the columns would be a transverse double bracket member, supporting two longitudinal girders. Each longitudinal girder would support a single running rail, cushioned on sound-deadening material, and with miters at the expansion joints to eliminate rail clicking.

A sway allowance has been made of 12 deg. 41 min.—equivalent to the calculated deflection under a sustained transverse wind loading of 70 mph. Speeds on curves have been calculated at the same allowance.

• **Cost data**—Cost estimate for the initial outlay—construction, equipment purchase, etc.—is $137 million. Of that, $61 million is for the overhead structure and stations, $22 million for construction of the subway portion. To this, Coverdale and Colpitts added administration, taxes, and financing charges during the period of construction, to arrive at a total bond issue of $165 million.

The report also considers a shorter line, lopping off three stations at each end, to cover 28.6 miles of the route between North Hollywood and Compton. For this section, the basic cost is estimated at $111 million, with the added charges bringing the needed issue to $134 million.

From studies of public transport and vehicular traffic in the area, it was estimated that there are 1,115,000 potential customers a week for monorail. Based on comparisons of convenience, time, and cost, it was estimated that about 20% of this potential would be diverted to monorail. Applying travel patterns to the contemplated rate structure, it was estimated that an average of $0.298 would be collected from each passenger. Adjusting these

(*Continued on page 61*)

Engineers choose "fast, economical Cofar" for new 23-story Denver Club Building

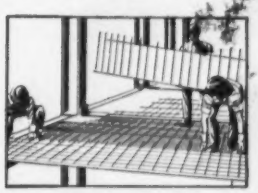
Denver Club Building
Architect: *Raymond Harry Ervin and Robert Berne*
Engineers: *Technic Engineering Company, Dallas, Texas*

HERE'S WHY

. . . says J. A. Crowley of Technic Engineering Co., Dallas, Texas, (structural engineers for the Denver Club Building)

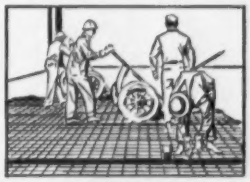
"From marble lobby to glass tower, the Denver Club Building will feature the newest and finest in office building construction . . . but that's not the only reason we chose Cofar! Cofar steel units serve as *both* permanent form and reinforcement. They eliminate costly wood forms in concrete construction . . . provide all the positive steel needed in the structural concrete slab and are extremely economical and easy to install. Cofar fills our bill perfectly!"

Today, throughout the country, firms like Technic Engineering Company are discovering the fast, economical Cofar way to modern concrete floor and roof construction. Cofar design requires no special procedure, has already been used in over 3,000,000 square feet of floors and roofs. For more information, write home or district office, Department ER-C.



Placing steel and form in one operation

Cofar steel units (with transverse temperature wires welded across corrugations) arrive at the job site cut to length to fit the building frame. Welded in place, they give frame added lateral strength.

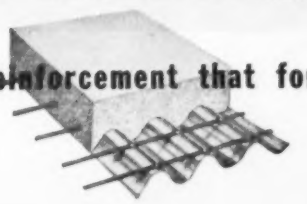


An immediate working platform

High-strength Cofar steel absorbs construction abuse. Cofar sheets serve as tight form for wet concrete. After concrete sets, Cofar provides complete positive reinforcement at bottom of slab.

Safe, strong concrete floors

Fast Cofar construction speeds occupancy, is suited to steel or concrete frame construction. Cofar monolithic floors provide complete plate action for concentrated loads, horizontal forces.



the reinforcement that forms

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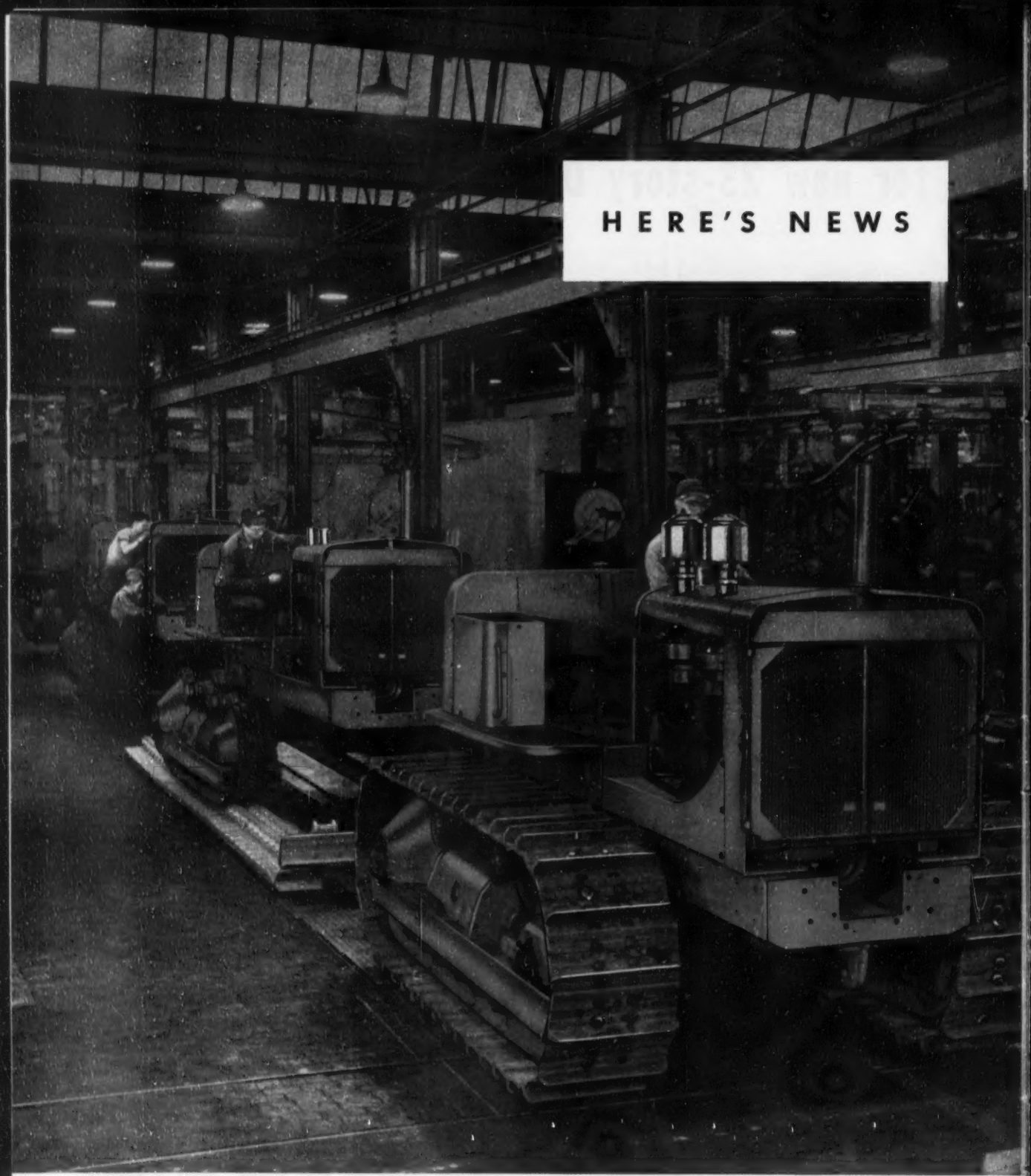

They're here now! **28,000-lb. HD-15's with torque converter drive are already rolling off the assembly line.**

Allis-Chalmers Powerful HD-15 adds to its big work advantages

. . . now offers choice of two outstanding drives—

standard transmission with time-saving shift pattern,

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From its introduction, the Allis-Chalmers HD-15 has set new standards in performance and long-life service . . . in a new size class. It combines outstanding strength and balance with plenty of power, plus a simplified, time-saving transmission that gives big work output. In addition, the HD-15 offers remarkable service simplicity, with features like unit assembly and 1,000-hour lubrication intervals for truck wheels, idlers, and support rollers. It has proved itself the kind of tractor required on today's jobs.

Now, hydraulic torque converter drive is added as optional equipment — an additional working advantage for the powerful HD-15. This advanced design drive was introduced by Allis-Chalmers in the world's *first* torque converter tractor nine years ago. This modern drive gets more done because it automatically provides the right combination of speed and pull every working minute . . . and hydraulic cushioning assures longer life for both tractor and auxiliary equipment.

Now you can choose the HD-15 with standard transmission *or* hydraulic torque converter drive. Either way you'll be getting the most advanced tractor in the business. Let your Allis-Chalmers dealer give you *all* the reasons why.

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Symbol of greater output, longer life.

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"A salute to those who made it possible" *

Fenestra Door-Frame-Hardware Units in the Robert N. Mandeville High School, Flint, Mich. Architect: Bennett & Straight, Dearborn. Contractor: Karl B. Foster, Flint.

HOW TO SAVE $100 PER DOOR

in your new building or remodeling

Here are four good reasons why building owners are saving this kind of money with Fenestra* Hollow Metal Door-Frame-Hardware Units:

1. *They cost less to buy* because they are mass produced on special jigs that eliminate a lot of expensive time and labor. You get production-line economy—*not* custom job costs.

2. *They come to the job complete*—pre-fitted frame, door and hardware are specifically made for each other. No time lost in planning or ordering separate elements that fit each other.

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4. *And you continue to save on maintenance* because Fenestra Hollow Metal Doors can't warp, swell, stick or splinter. They always open easily . . . smoothly. And they close quietly, because inside surfaces are covered with sound-deadening material.

For strong, solid quality at unusually low cost, check on Fenestra Doors—there's a door for every purpose in the Fenestra line: Entrance Doors, Flush or Regular Interior Doors with glass or metal panels, Doors with the Underwriters' B Label. For pictures and details, write to Detroit Steel Products Company, Dept. ER-3, 2286 E. Grand Blvd., Detroit 11, Michigan. *®

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figures to a year's prospects, the estimators arrived at a total of 78,952,000 passengers annually (15% drawn from present public transportation, 85% from private automobiles), with an estimated annual revenue of $23.5 million. For the short line, 69,501,000 passengers would be expected to yield $21 million annually.

Operating expenses were estimated at an annual $8.8 million, including $1.2 million for maintenance of way and structures, $2.4 million, for operating cars (with one motorman and one guard per train), $1.7 million for power. This figures out at 33.8¢ per car-mi. for 23,750,000 car miles a year. Adding insurance, interest, and amortization charges, gives annual expenses of $22 million, excluding taxes. With taxes (including a franchise tax of 2% on the gross revenue, and a property tax of 6½% on the assessed valuation), annual expenses would total $27 million. For the short line, the equivalent figure is $21.3 million.

Recognizing that the transit industry "has ceased to have a strong appeal to the investor" and that there would moreover be resistance to investment in a new system not yet proved in practice, Coverdale and Colpitts believes that the bonds must be made as attractive as possible. Thus it figures on 5% interest on the bonds, and amortization within 20 years at most.

Under these conditions, as the above figures show, there would be an annual deficiency after taxes of $3.3 million for the long line. On the short line, revenue would just cover expenses. Coverdale and Colpitts believes that the short line would be economically feasible without tax exemption, provided that there would be no substantial damage claims by abutting property owners—a possibility regarded as unlikely, but worthy of consideration. The long line would be feasible only with tax relief.

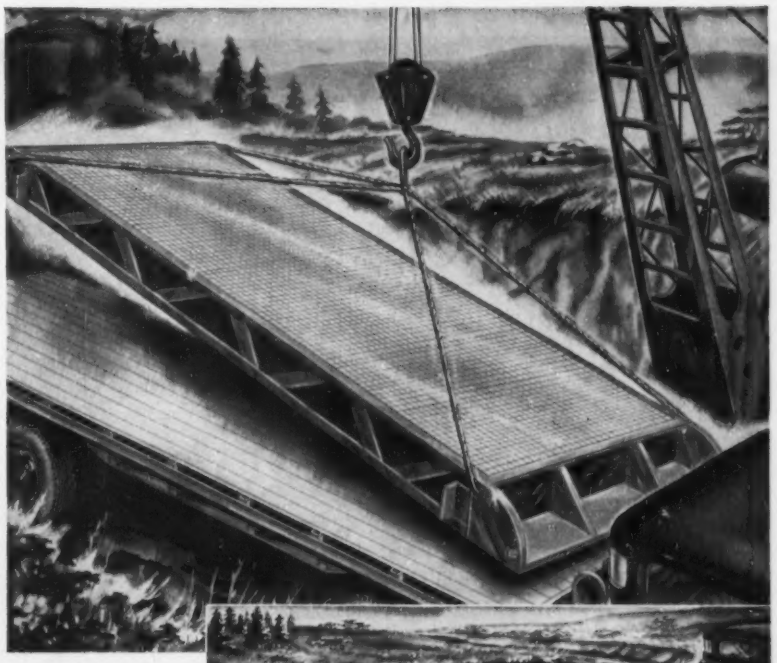
In the case of either line, Coverdale & Colpitts believes it would be difficult to attract investors unless the authority is able to set its own rates and operating conditions.

Veteran municipal engineer designs novel split bridge

An unusual design for bridging Union Bay at Seattle, Wash., has been proposed by City Engineer W. E. Parker.

The bay, used occasionally by large vessels passing to or from Puget Sound via the Lake Washington Ship Canal, is bounded by broad marshes that would render impracticable construc-

(Continued on page 64)

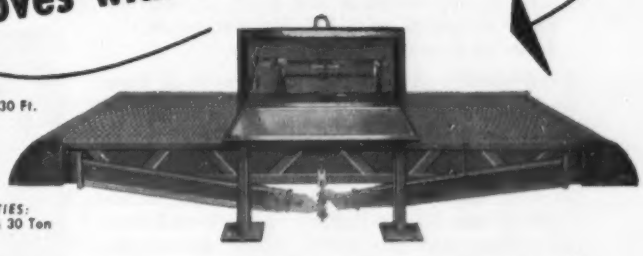


ABOVE: crane lifting portable scale

RIGHT: on the way to a new site

THURMAN PORTABLE Truck Scale

Moves with the job! Saves costs!



PLATFORMS: 18, 22, 24 & 30 Ft.

CAPACITIES: 20, 25 & 30 Ton

LOW IN INITIAL COST . . . this outstanding scale provides the full mobility you need when changing sites. Eliminate the cost of digging and placing expensive concrete pits. The Thurman Portable needs no pits. Any flat ground will serve as a base. Earth or gravel can be used as ramps. Thurman will give you precise, accurate weighing year after year without major maintenance costs. Solid steel deck is cushioned with bearings to absorb shock and protect vital parts. Fully weatherproofed.

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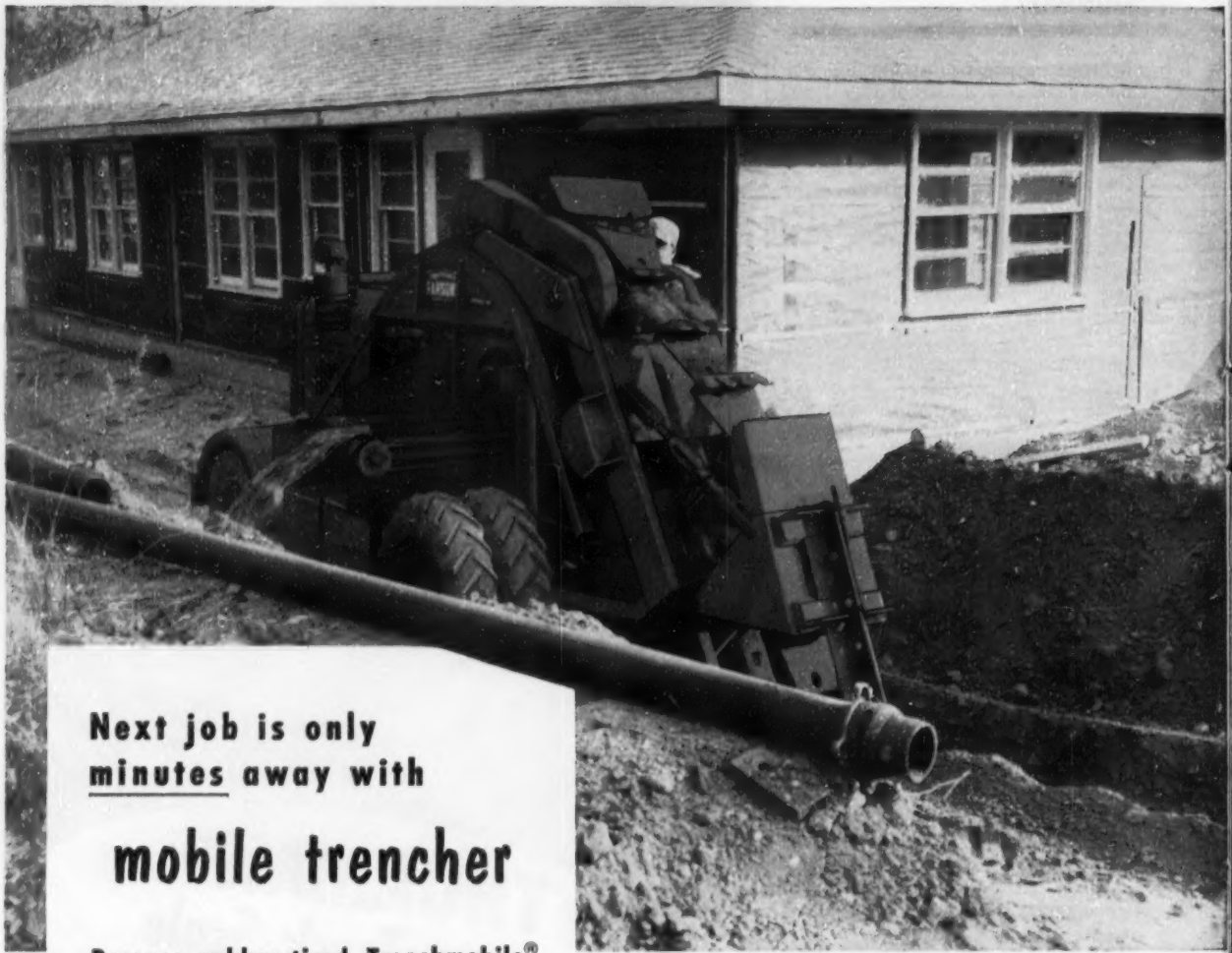

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Parsons rubber-tired Trenchmobile® runs anywhere at a moment's notice. A job 6 miles away can be started in less than 30 minutes from "now". Trenchmobile drives there cross-town, through traffic at 12.6 m.p.h. . . . digs the trench at speeds up to 14½ feet per minute . . . drives on to next job without delay.

This mobility on rubber is the answer to all those widely-scattered, small yardage trenching jobs where you formerly had to bring in cumbersome, oversize equipment, or use slow, costly hand labor. Trenchmobile is big enough, too, for a lot of main-line excavations. You get trench widths from 8 to 16 inches . . . depths to 5 feet, for water and gas mains, service connections, pipe reclamation, foundation footings, underground cables, lighting systems.

Let Parsons distributor show you how rubber-tired Trenchmobile can put your jobs on a fast "work-and-run" basis. Also check Parsons 5 big sizes of ladder and wheel-type Trenchliners®.

HOLDS ACCURATE GRADE . . . Positive down-crowd on the digging boom starts cut fast, maintains accurate grade. Buckets are high-carbon cast steel. Self-sharpening, easy-in-easy-out "Tap-In" teeth assure top digging efficiency at every width and depth, in all types of soil and job conditions.

BACKFILLS ITS OWN TRENCH . . . Backfill blade (optional) doubles usefulness of the Parsons Trenchmobile . . . lets you do the entire job of trenching and backfilling with one-man, one-machine economy. The husky six foot blade is readily adjustable from straight bulldozing to angled position . . . is raised and lowered by hydraulic control.

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DODGES SIDE OBSTRUCTIONS . . . Shiftable, reversible belt conveyor places spoil bank on either side of trench . . . lets Parsons Trenchmobile work in close to buildings, poles, without swerving from grade line.

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Moto-Bug power wheelbarrow hauls 10 cu. ft. (or 1500 lbs.) of any bulk materials. Has instant gravity-dump, with snub-line control. Climbs 20% ramps or grades. There's full power forward and reverse . . . and safe, automatic brake control. Hopper is interchangeable with 1500-lb. platform, or ½-ton (5-ft.) fork lift. Send for Moto-Bug bulletin. Also check Kwik-Mix line of concrete mixers, bituminous and plaster-mortar mixers.

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Johnson fast-filling "Hi-Speed" Batchers

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There's no time-out for continuous manual clutch adjustments . . . no "compromise" settings with this Koehring heavy duty ½-yard. All main clutches are self-adjusting . . . heat-compensator springs make tension changes automatically. This maintains big yardage performance with shovel, hoe and dragline, is equally important on intermittent usage of crane and clamshell work. 3 larger sizes up to 2½ yds., cranes to 79½ tons.

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The types of industries listed are all repeat users of **Tru-Lay Push-Pull Controls.** Experimental applications are not shown.

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Dairy Products Machinery
Dental & Surgical Equipment
Die Casting Machinery Diesel Engines
Drinking Water Coolers
Electrical Appliances
Electrical Generating Equipment
Electrical Machinery
Electrical Transmitting Equipment
Electronic Equipment
Elevator Control Panels
Fire Protection Equipment
Food Processing Equipment
Forging Machinery
Foundry Equipment
Gas & Oil Production (Test Stands)
Glass Making Machinery
Grain Processing Equipment
Hat Machinery Heating Equipment
Hydraulic & Pneumatic Equipment
Ice Cream Making Machinery
Laundry & Dry Cleaning Equipment
Leather Working Machinery
Lumber & Saw Mill Machinery
Marine Equipment
Materials Handling Equipment
Metal Mining Machinery
Metal Working Machinery—Machine Tools
Military & Naval Equipment
Motorcycles & Bicycles
Nuclear Science Equipment
Oil Refinery Equipment Ordnance
Packaging Machinery
Paint Making Machinery
Paper Making Machinery
Photo Equipment (manufacture)
Plastics Fabricating Machinery
Plastics Producing Machinery
Power Plant Equipment
Printing & Binding Machinery
Quarrying Machinery
Radio & Television (manufacture)
Railroad Equipment
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Wire Making Machinery
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X-Ray Machines

Whether your interest is in a single application of this versatile

PUSH-PULL CONTROL

or in its inclusion as a component of the product you manufacture, we would welcome your request for our DATA FILE for your further study.

Because TRU-LAY PUSH-PULL CONTROLS are "SOLID as a rod but *FLEXIBLE* as a wire rope" their use has simplified the design and improved the operation of literally hundreds of products as indicated in the accompanying list of repeat users.

These fine controls are designed, and painstakingly built, to have the qualities of ACCURACY, HIGH LOAD CAPACITY, FREEDOM FROM TROUBLE, LONG LIFE, FLEXIBILITY . . . they are frequently and successfully used in conjunction with electrical, hydraulic and air controls . . . they are thoroughly effective under almost any operating condition.

Here are some of the jobs they handle well . . . HOT jobs on jets and industrial furnaces . . . COLD jobs down to −70°F. . . . WET jobs in food processing and marine applications . . . DIRTY jobs in cement mills and coal mines . . . CORROSIVE jobs in chemical processing . . . HEAVY, TOUGH jobs on construction machinery . . . LIGHT DUTY jobs on business machines, drinking water coolers . . . REMOTE jobs 150 feet or more from control point . . . they DAMPEN VIBRATION to protect delicate instruments . . . and LUBRICATION of the inner, working member is taken care of *for life* during assembly.

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tion of a high-span bridge because of an approach problem.

Since any low-level bridge across the bay would have to include a draw span, Parker has proposed a split roadway, each branch carrying six lanes of traffic over a floating drawspan. While one drawspan was open to permit passage of a vessel, the other branch would carry vehicular traffic in both directions.

As the vessel passed one branch, the bridge would close behind it and traffic would be shifted to that branch by means of traffic control signal devices, leaving the other branch clear to open and allow the ship to pass through.

Plans under study call for a "storage space" 750 ft long and 150 ft wide between the drawspans. Small boats could pass under approaches at all times.

This project, says Parker, would cost about $8 million, or half the cost that would be required to construct a higher bascule bridge.

Parker credits H. W. Tyler, veteran engineer in his department, with the bridge design.

New Orleans votes on bonds, lakefront work is planned

The Levee Board of New Orleans recently voted by a four-to-one majority, to ask permission of the Board of Liquidation, state debt, and the State Bond and Tax Board to issue $8 million in bonds for a lakefront improvement program that will include enlargement of the New Orleans airport.

The plans for airport alteration include extension of one runway to 6,000 ft, and construction of a new 10,000-ft runway.

Planned lakefront work includes construction of new levees and embankment, and a new seawall along the lakefront. Reclamation of land is proposed to be carried out by means of the installation of additional flood control facilities.

The one dissenting vote was cast by a board member who voted "no—at this time," pending a conference with a citizens' committee seeking financial aid for schools.

The securities, when issued, will be first mortgage bonds to mature in 16 years. They will be secured against the property improved, plus pledges of the revenues derived from the property.

It is estimated that the improvement will take approximately eight months to complete.

(*Continued on page 67*)

Jaeger offers new hi-performance 2″ pump

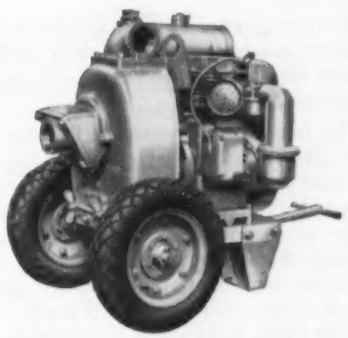
Pumps all the water a 2″ hose can handle. Operates at easy speeds. Weighs only 190 lbs.

Delivering its full rated capacity of 10,000 gph when operating at only 2400 to 2550 rpm (as much as 400 rpm below the speeds of similar ordinary pumps) this Model 2PN actually pumps all the water that can be pulled through a 2″ suction line under average operating conditions. 28″ vacuum at the intake flange is not unusual.

Put this "Sure Prime" pump on your job and see how conservatively it has been rated, even at heads well above 100 ft. Equally remarkable, this performance is achieved by a pump that weighs only 190 lbs. on big, 13″ diameter pneumatic tires, only 160 lbs. on base, and measures only 24″ x 21″ x 26″ high, including tires.

Doubly-sure fast priming is guaranteed by Jaeger's combination of inherent self-priming and "jet" priming — two independent, simultaneous priming actions. Powerful Wisconsin AKN engine, delivering 5.3 hp at 2500 rpm, is ideally suited to this pump. This easy speed means longer life with high efficiency maintained by Jaeger's self-cleaning shell of 20% steel, long-life Lubri-Seal on pump shaft, reversible liner plate, and an impeller adjustable for wear.

For complete information on this model and other Jaeger pumps up to 10″ size, see your Jaeger distributor or send for Catalog P-10.



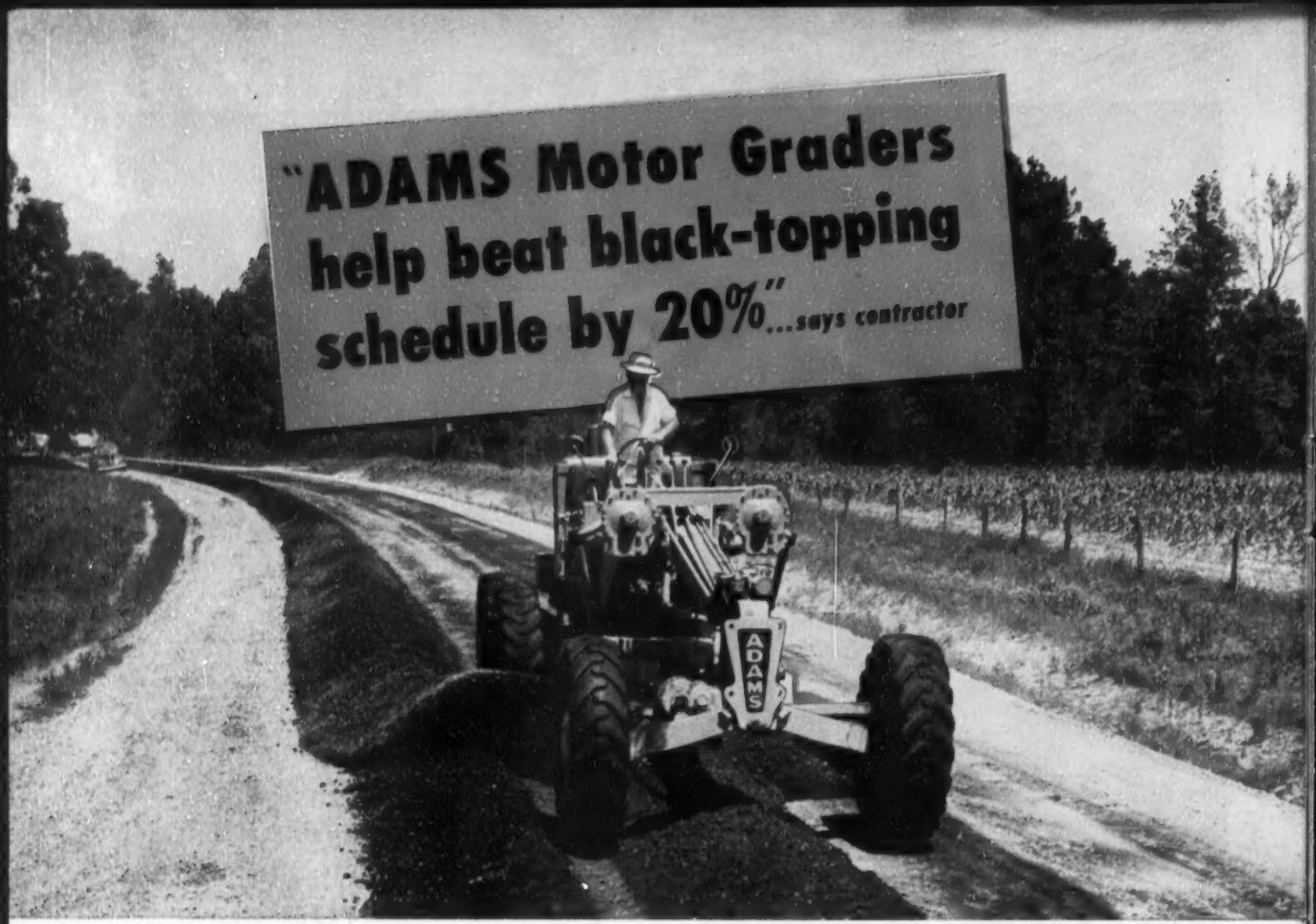
Only 190 Lbs. on Pneumatics

With capacity and pressure enough for good sized pumping jobs, this Model 2PN is yet light and small enough for a plumber's work. On cushion rubber tires weighs only 180 lbs., on base only 160 lbs.

THE JAEGER MACHINE COMPANY

200 Dublin Avenue, Columbus 16, Ohio

COMPRESSORS • TRACTOR LOADERS • TRUCK MIXERS • CONCRETE MIXERS • PAVING MACHINES



On the job shown above, Freshour Brothers, prominent Arkansas contractors, are using 100 hp. Adams Motor Graders for mixing and spreading 11 miles of black-top.

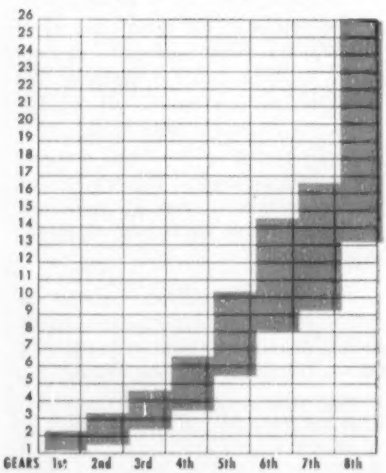
Mr. Dwight Freshour, partner and superintendent, says of these machines, "The power and speed of our Adams Motor Graders helped us complete this job 20% ahead of schedule."

The reason that Freshour Brothers, and other contractors, get this kind of schedule-beating performance is because Adams Motor Graders provide 8 overlapping forward speeds—not just 6, as in most machines. This range gives you an *exactly right speed* to do every type of work at the fastest practical rate. You can do a given job faster or do more work per day. And, you go from job to job faster, too—up to 26 mph.—and that saves productive time.

Let your local Adams dealer demonstrate how these machines will save time and cut costs for you.

J. D. ADAMS MANUFACTURING CO., INDIANAPOLIS, IND.

8 overlapping forward speeds



ADAMS

Motor Graders TraveLoaders Pull-Type Graders

Condemn death trap

Urge complete revamping of 14-mi Westchester pkwy

The Hutchinson River Parkway, connecting northern New York City with the Merritt Parkway in Connecticut, came under the guns of engineers of the Westchester County (N. Y.) planning, park and public works departments recently.

The 14.5-mi connecting link was touted upon its completion 27 years ago as the dream highway of the future, but it proved a brief future indeed, especially for the many victims claimed on account of the narrow serpentine route.

Based upon a survey and report on remedial measures and costs prepared by two traffic engineering firms, recommendations called for complete rebuilding of the highway after it was found to be "relatively safe for speeds of only 25 mph."

• **Ambitious program**—The complete program for the reconstruction of the parkway is estimated at $35 million. It entails straightening the route through realignment, increasing the width in the southern portion to eight lanes instead of the existing four and increasing the width of the northern section to six lanes.

Other safety modifications would be the installation of wide, nontraversable center malls, wider traffic lanes and the creation of adequate shoulder sections with acceleration and deceleration lanes provided.

Alternatives were presented in the form of an $8-million improvement of pavement to eliminate dangerous longitudinal joints, and an $11-million realignment that would continue use of the parkway as a four-lane route. Both were rejected as a solution because anything short of the complete program would be stop-gaps dangerously inadequate.

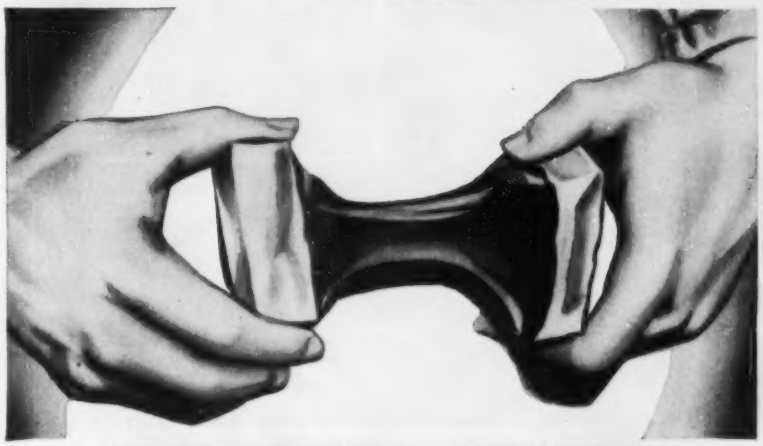
All departments were in complete accord that the work must be done. Heavy cost of land acquisition and strong opposition by adjacent communities have ruled out the possibility of a parallel parkway.

Authorities said, "rebuilding the Hutchinson is probably the most important and expensive proposition" to be brought before the public and county supervisors in years.

Figures show that while the increase in Westchester population has been less than one per cent annually, traffic on its parkways has increased

(*Continued on page 68*)

NOW! The easiest to handle Joint-Sealing Compound is also the BEST!



KAPCO

RUBBER ASPHALT JOINT SEALER

☆ BETTER ADHESION!

☆ WATERPROOF!

☆ EXPANSIBLE TO WITHSTAND BOTH EXTREME HEAT AND COLD!

Kapco Rubber Asphalt Joint-Sealing Compound, manufactured in Keystone's modern Chicago Heights plant, meets Fed. Spec. SS-S-164 (supersedes Fed. Spec. SS-F-336a), also C.A.A. Spec. P-605 and all State Highway Dept. Specs. for this type of seal. It comes in 50# strippable bags designed for full protection and ease of handling.

Order separately or in combination with other KAPCO products which include famous Kapco Tongue and Groove Joint, Kapco Fibre or Fibreglas Expansion Joint, Kapco Concrete Curing Compound, etc., etc.

For your own convenience, why not order all of your asphalt road-building materials from one source!

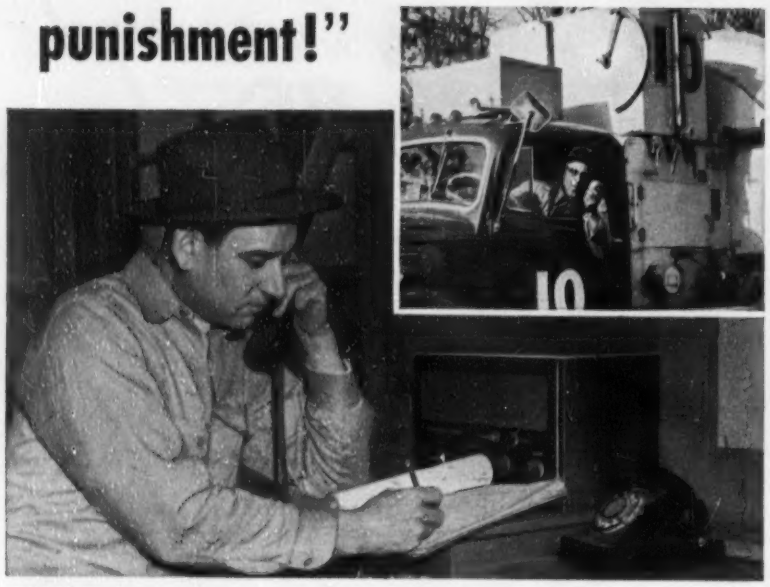
WE GUARANTEE PROMPT SERVICE!

KEYSTONE ASPHALT PRODUCTS COMPANY

DIVISION OF AMERICAN-MARIETTA COMPANY

General Offices: American-Marietta Building, 101 East Ontario Street, Chicago 11, Illinois

"G-E 2-Way Radio takes terrific punishment!"



DISPATCHER, Frank Campsen, has complete control of all deliveries. He uses General Electric 2-way radio constantly for initial or rerouting instructions to trucks on the road.

TRANSIT-MIX OPERATOR, Roscoe Fowler, picks up G-E handset, reports a completed job. If Fowler has a delay in unloading or mechanical failure, instant radio contact helps solve the problem.

2-WAY MOBILE RADIO

"We've often wondered," says the Spartanburg Concrete Company of South Carolina, "how our G-E 2-way radio system can take the beating we give it." The answer is simple. General Electric builds this communications equipment to deliver the same solid service you expect from a bulldozer . . . designs it specifically for construction work!

Why not answer your need for instant communication by planning a G-E 2-way mobile installation. *With radio* you'll save time and money. *With G-E* you have the *bonus* advantage of operating equipment that is famous for long-life . . . extremely low maintenance. Call the G-E Communications Counselor at a local office or mail this coupon today!

SEND FOR FREE INFORMATION!

General Electric Company, Section X2234-18
Electronics Park, Syracuse, New York

Please send bulletin ECR-47 showing how General Electric 2-way radio can aid me in the construction business!

NAME.....COMPANY.....

ADDRESS.....

CITY.....STATE.....

GENERAL ELECTRIC

at the rate of almost 10% per year.

It is believed that tolls should pay a major portion of the operating costs, interest and amortization.

Wilbur Smith and Associates, of New Haven, Conn., handled the survey operations, and Edwards, Kelcey & Beck, of New York City compiled the data for cost estimates for the program.

President's plea answered—Negro housing is provided

A recent call by President Eisenhower for concerted action against the widespread lack of good housing for Negroes—is being answered by at least two cities.

In Portsmouth, Va., the Development and Housing Authority has completed one 400-unit housing project for Negroes, and ground has been broken for an additional 665 housing units.

The new $7-million program will provide a total of 1,065 Negro families with a brand new way of life.

• **Another city acts**—Pittsburgh, Pa., also is doing something about the problem. The Mellon National Bank and Trust Co. in that city is ready to back the construction of 100 homes—primarily for Negroes—on city sites at a cost of at least a million dollars.

Prices will range from $12,000 to $15,000 for five and six-room homes. Key partners in the program are the Home Builders' Association and Home Financing Agencies.

Atty. Paul F. Jones, first Negro ever named to the Pittsburgh city council, was assigned the job of locating lots. Five sites already have been bought, action is pending on others, and the first ground-breaking is scheduled for this week.

• **Non-profit organization**—The HBA has formed a non-profit organization, Private Housing, Inc., each of nine member builders donating $5,000 out of his own pocket toward the project.

With this fund, the sites are being purchased for non-profit resale to any of the 250 responsible bonded builders, members of the HBA, who will contract to put up the homes.

"There will be no 'fast buck' artists in this project", say the HBA officials. Each builder will operate independently, but pooled purchasing of materials will be encouraged by the association where possible.

House designs will vary somewhat, but marked variations will be a private matter between the builder and prospective owner.

MEMO

Write for your copy!

NEW Plasteel ENGINEERS' HANDBOOK now available

ROOFING and SIDING

ROOF DECK

INSULATED PANELS

ENGINEERS • ARCHITECTS • CONTRACTORS • MAINTENANCE MEN

This New Engineers' Handbook is a valuable construction guide for the use of Plasteel Products. Complete instructions and specifications—fully illustrated to simplify the efficient and economical erection of Plasteel—the only protected metal roofing and siding with Mica advantages! *Mica does make a big difference!*

PLASTEEL PRODUCTS CORPORATION
Washington, Pennsylvania

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Please Rush New Plasteel Engineers' Handbook

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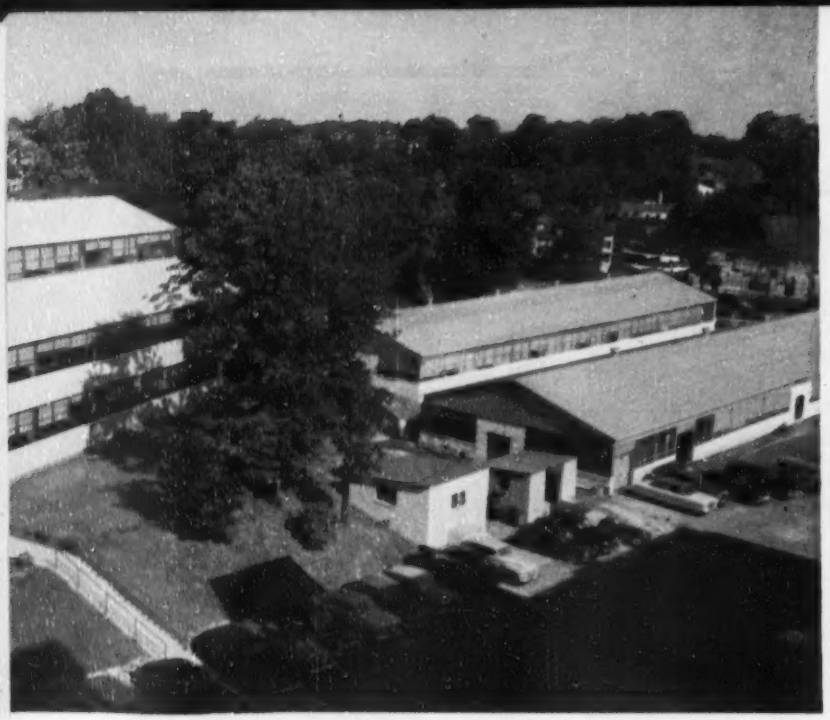


Attractive-looking plant site at Remington Rand Advanced Research Laboratory owes much of its good looks to two aluminum-sheeted Butler buildings.

BUTLER buildings cut months off building time for Remington Rand

"We needed a building in a hurry when we signed the contract for the first of our two 50′ x 200′ aluminum-sheeted Butler buildings in 1948," reports Mr. S. E. Szemetko, plant engineer at Remington Rand's Laboratory for Advanced Research, Norwalk, Conn. "It was ready for use only 10 weeks later—which proved the value of Butler's fast delivery and quick erection.

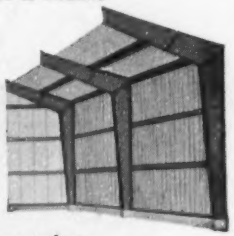
"Butler buildings also proved adaptable. When we built our 4-story office building in 1952, we economically combined Butler buildings with masonry construction. This provided the space we required, on a limited lot. We used a 40′ x 300′ Butler building for the entire fourth floor, and two 20′ x 300′ Butler sections on the sides of the third floor, totaling 24,000 square feet of well lighted, well insulated, functional office space."

Before you build—see your Butler dealer. He'll show you why corporations like Remington Rand, Deepfreeze, Coleman Company, Norwich Pharmacal, Santa Fe and Westinghouse use Butler buildings. He'll show you the pre-engineered, quality features that bring you superior, permanent construction, with clear-span interiors, rigid frame strength for suspending conveyors and monorails, better fire-safety. He'll show you real construction economy—in lower first cost, lower erection costs, lower maintenance. Write office nearest you for his name and more information by mail.

Here is why BUTLER *is a better buy*

Every Foot of Floor Space is Usable

There are no interior posts or columns to waste space and create work-slowing "bottlenecks." Rigid-frame construction also shrinks maintenance costs . . . extends building life.



Fast Erection . . . Easy Expansion

Precision-punched and dimensioned bolt holes speed erection—simplify expansion or dismantling and moving. Galvanized bolts, with Neoprene rubber washers, lock deep-corrugated sheets firmly to the sturdy frame.

Weatherproof Protection

The one-piece, die-formed roof ridge eliminates ridge roll—helps to make the building leakproof and weather-tight.

Triple-Strength Corrugated Sheets

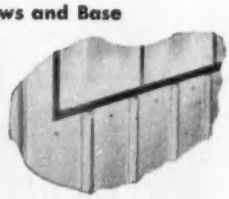
Butler sheeting with deep-formed corrugations on 12-inch centers, is three times as strong as ordinary corrugated sheets. Overlapping corrugations bolt tightly together for maximum strength and weather protection. Your choice of steel or aluminum sheeting.

Attractive Curved Eaves

The neat, die-formed eaves—which bolt to the roof sheets—add to the appearance of Butler steel buildings...increase the strength of the eaves . . . help insure weather-tightness.

Weather-sealed Windows and Base

Where corrugated sheets meet windows or the foundation, they are tightly crimped, for a snug fit that keeps out snow, moisture and rodents.



BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

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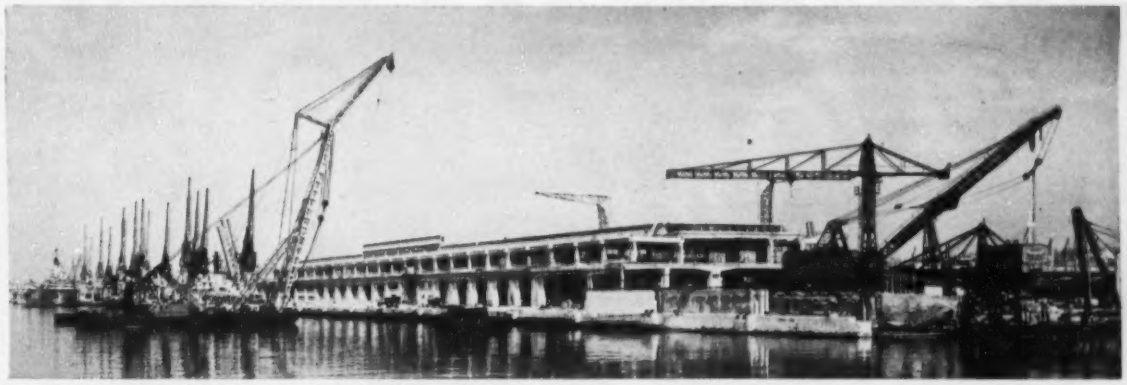


ALL-PRESTRESSED MARINE TERMINAL, in Le Havre, France, is built entirely of over 2,800 structural elements, prefabricated at Rouen and hauled by rail some 50 miles to be erected and post-tensioned in place. The two-story terminal is 1,900 ft long.

Marine Terminal

All-prestressed structure was precast for erection like a steel building

A new marine terminal, built to replace one destroyed in the war, at Le Havre, France, is constructed entirely of precast prestressed members, erected and post-tensioned in place. The new terminal is 1,900 ft long and 50 ft high, with two levels for the handling of cargo from ships at the quay-side. Built on rock fill backed up against a sea wall on the old beach, the whole building (there are over 2,800 structural members) was precast in a special prefabricating yard in Rouen, 50 miles from the job site.

Floor system of the terminal is particularly interesting for the type of

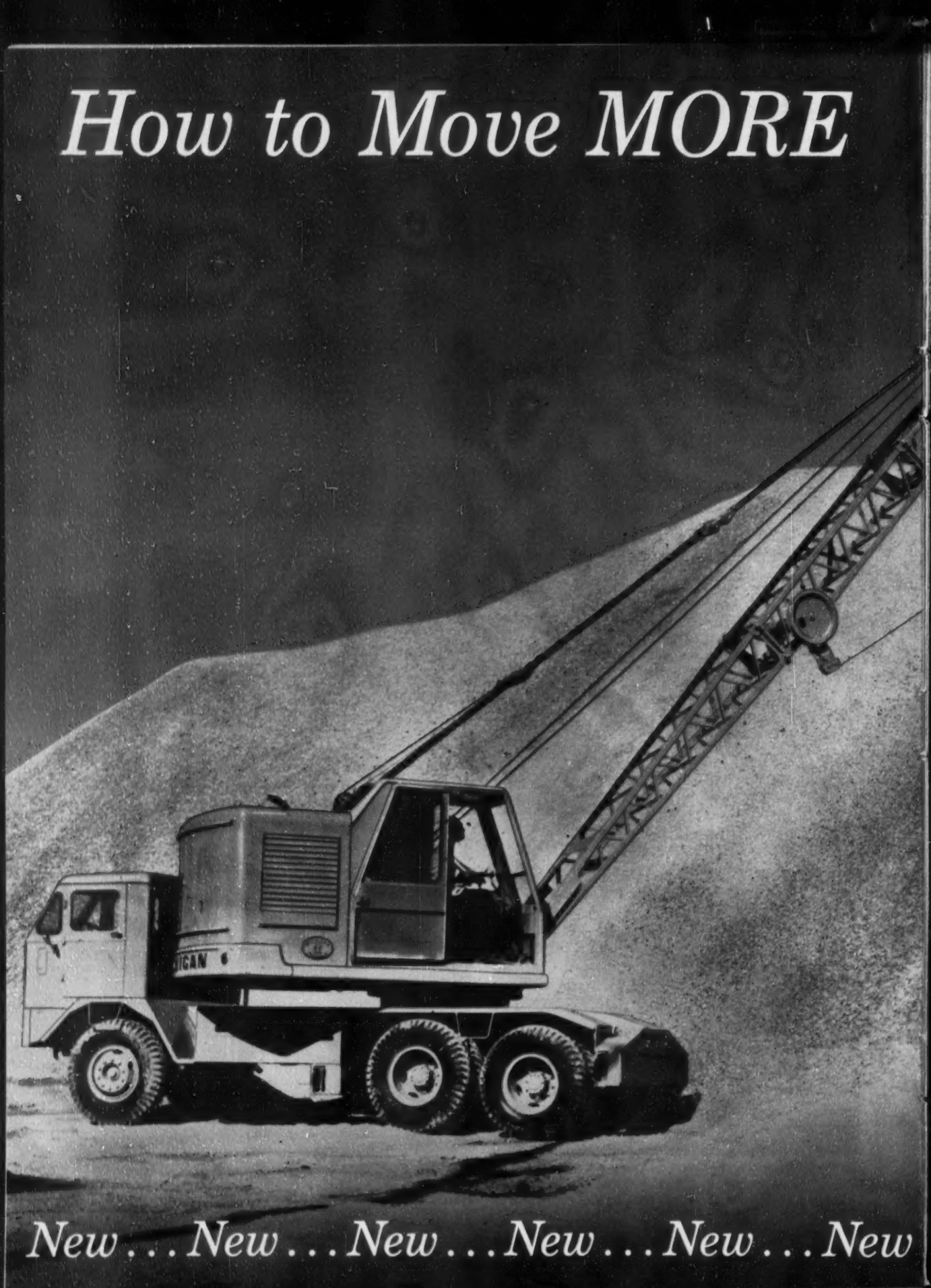
(*Continued on page 74*)

FLOOR BEAMS, of T-shape, have wide upper flanges which form floor slab. Ducts for prestressing wires are cast in beams and columns for post-tensioning in place.

SAWTOOTH ROOF is formed by concrete mullions and an inclined curved slab springing from V-shaped beams which are in turn supported by seats formed along a concrete I-beam.

WAFFLE EFFECT of ceiling is produced by webs of longitudinally placed floor beams and their stiffening webs—which form continuous transverse webs when floor beams are in place.

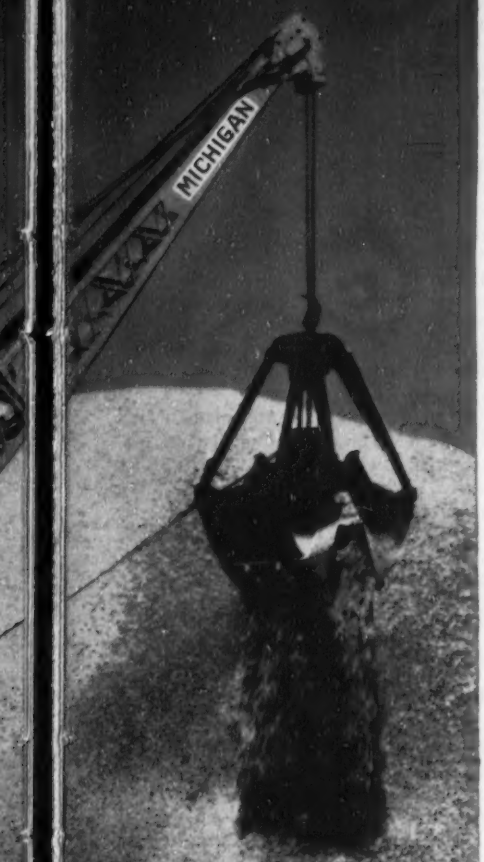
How to Move MORE



New . . . New . . . New . . . New . . . New . . . New

with a **MICHIGAN*...**

in 3/4 yard bites!



CLARK EQUIPMENT COMPANY
presents the

MICHIGAN Series "24"

Model T-24 Truck, 6 x 4 and 6 x 6; Model C-24 Crawler Shovel, Clamshell, Crane, Dragline, Hoe

14 Reasons Why — the MICHIGAN Series "24" Is Your Best Buy in '54

Full Vision Cab—new, stylized; all-around and overhead vision—3604 sq. in. glass; comfortable, quiet

Air Controls—clutches actuated by famous MICHIGAN* Air Controls

Power Clutches—single plate, double-disc, multiple-segment—air operated

Primary Drive—power transmitted through two sets spiral bevel gears running in oil

Shafts and Drums—hoist and crowd drums ball bearing-mounted on splined alloy steel anti-friction bearing-mounted shafts

Swing Brake — air operated; standard equipment

Circle Gear Casting—large diameter double-flange one-piece steel casting

Hook Rollers—six 7½" diameter, tapered, adjustable; ball-bearing mounted

Cast Turntable — machinery deck with boom hinge pin bracket and hook roller brackets—single steel casting

Big Brakes—powerful hoist and crowd brakes, 30" diameter

Worm Gear Boom Hoist—independent high speed hoist with automatic safety brake—standard

Removable Counterweight — power-handled for easy, quick removal or assembly

Truck Chassis—heavy duty: big engine, transmission, axles; deep section alloy steel frame, cross-braced, welded; rear and center outriggers standard

Crawler Base—one-piece cast steel carbody and circle gear; spring loaded safety brakes; 24" tracks standard

You'll find the MICHIGAN Fact-Folio handy and helpful; contains full specifications, an interesting book "Get More Yardage Through Air Power," and numerous action photos. The coupon will bring yours promptly.

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390 Second Street, Benton Harbor, Michigan

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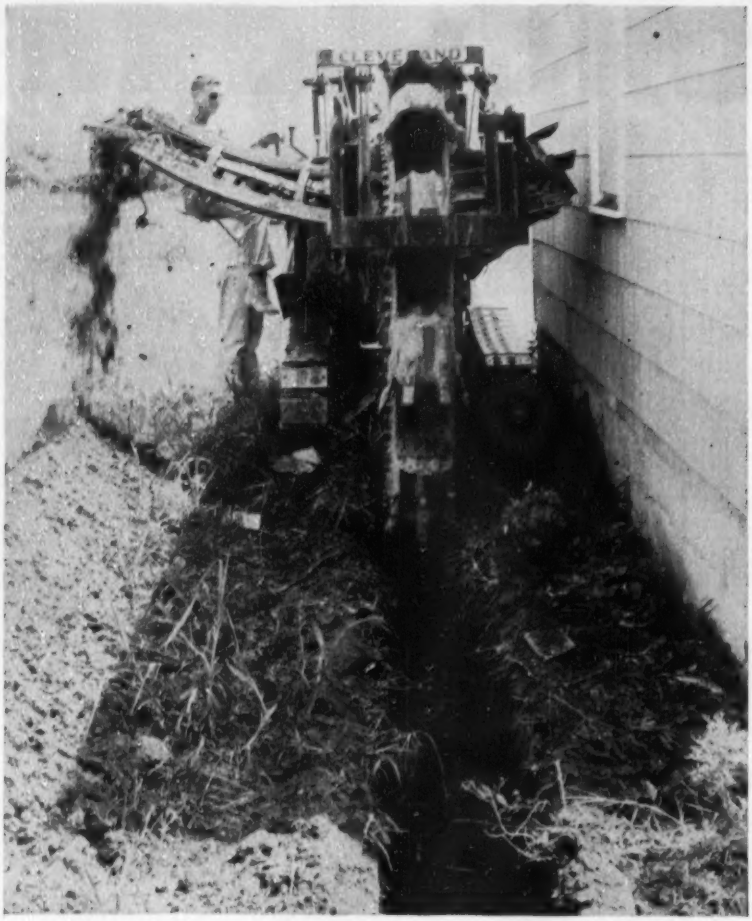
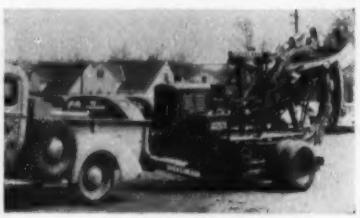


20" from Trench to Wall

IN NORFOLK, VA. this Model 92 CLEVELAND "Baby Digger" shows how its useful compactness enables it to place a trench safely within 20" of a house wall. Balanced perfectly on its smooth full crawlers, the 92 maneuvers easily in even the closest quarters, with less damage to lawns, walks and driveways. Because it digs any size of trench from 10 to 20 inches wide and up to 5 feet deep, it is usable on a wide variety of jobs.



The 92 hustles safely from job to job . . . at legal limit speeds . . . because it's so easily portable on the drop-axle, tilt-bed CLEVELAND T5 Trailer.

Write for descriptive literature and specifications or get the full story on CLEVELANDS from your local distributor.

THE CLEVELAND TRENCHER CO.
"Pioneer of the Modern Trencher"
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

prestressed "waffle" slab that is produced by longitudinal floor beams alone. The beams are T-shaped with the top flange forming the floor deck and the lower edge of the web forming the longitudinal sides of the waffle pan. Transverse sides of the waffle pans are formed by short stiffening webs—incorporated in each floor beam—so that when all beams are in place, a continuous transverse web across the ceiling is formed. Cable ducts were cast in the floor beams, both in the main web and the stiffening web. When in place and cables are threaded, the whole is tied together by prestressing the floor system longitudinally and transversely.

All structural members of the terminal were precast at Rouen, 50 miles from the job site.

Architects for the terminal were Urbain Cassan and Boutet de Nonvel; engineers were M. E. Freysinnet, Pierre Lebelle, Jacques Muller, and builders were Les Entreprises Campenon-Bernard, La Societe de Construction des Batignolles, La Compagnie Industrielle de Travaux, and Les Entreprises Thireau-Morel.

Mexico City sinking faster as wells are tapped heavily

Mexico City—built over an old lake bed—is sinking twice as fast as it was six years ago. A recent official study of the situation shows that the rate has jumped from 5.5-in. in 1948 to 11.8-in. annually. (Back in 1937 it was 1.6-in. a year.)

Officials place the principal blame on continued extraction of water from the city's 5,000 artesian wells. This source still supplies a good part of the water for the 3,000,000 population.

The sinking is more noticeable in some areas than in others. For example, one building in the heart of the city—the Palace of Fine Arts—has sunk over 16 ft since completion in 1937.

Sanitary facilities have taken the brunt of the damage. The average sewerage system of the central part of the city is sinking below the outlet canals and tunnels. This results in frequent breaks and clogging of pipe lines. In order to boost the sewage from one level to another, the city recently spent $600,000 for four 2,000-hp diesel engines.

But the solution, says the Governor General of Mexico's Federal District, Ernesto P. Uruchurtu, lies in curbing the taking of water from artesian wells and increasing the city's regular water supply from outside sources.

(*Continued on page 76*)

the three R's of sewer pipe

Right

Reasonable

Ready

Universal Vitrified — U. S. Concrete recognized generally by the leading engineers and contractors as the finest pipe made, owe this acceptance to three important factors.

In today's highly competitive market — product must be RIGHT in quality. The most modern plant facilities — the best brains in the industry must be employed.

In today's highly competitive market — the product must be REASONABLE in price. It must be competitive with every other source.

And lastly, product must be manufactured in such quantities and in such strategically located centers that shipments can be made quickly — READY when needed.

It has been the constant aim of Universal Vitrified — U. S. Concrete to merit the friendship of engineers, contractors and construction men. It will ever be their aim to have products RIGHT — REASONABLE — READY.

PRODUCTS

Sewer Pipe (Vitrified)	Slipseal Sewer Joint	Flue Lining
Sewer Pipe (Concrete)	Segment Sewer Block	Stove Pipe
Vitrified Liner Plates	Meter Boxes	Chimney Tops
Tylox Flexible Rubber Coupled Vitrified Pipe	Ship Lap Wall Coping	Chimney Pots
Aerodrane Filter Block	Septic Tanks	Fire Brick
	Drain Tile	Fire Clay

Vitrified Clay Plate Lined Concrete Pipe
Conduit for underground steam and insulated piping

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UNITED STATES CONCRETE PIPE CO.

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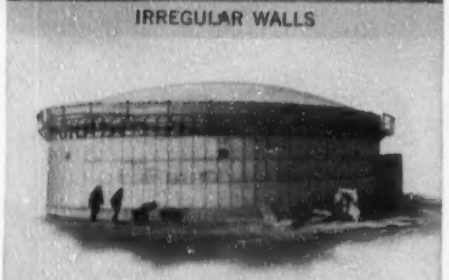
IRREGULAR WALLS



CIRCULAR WALLS

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UNI-FORM Concrete Forms *Form Anything!*

UNI-FORM Concrete Forms *form them all at Lowest All Around Cost!*

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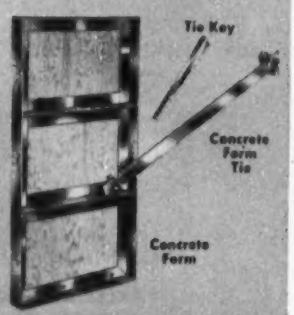
- UNI-FORM Ties guarantee automatically accurate walls
- UNI-FORMS are ready to use when they reach the job—start forming immediately
- One side alignment and bracing—saves up to 50% labor and lumber

3 SIMPLE ELEMENTS



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INTERNATIONAL

This plan already has been tried on a small scale. The Lerma Water Project, completed in 1950, was designed to bring water from the far side of the Continental Divide. The city gained a new flow of 5 cu meters per second—but not enough to eliminate the need for the wells.

It would cost around $115 million for a new water supply to meet Mexico City's requirements for the next 30 years, according to Uruchurtu. One step has already been taken to finance this program—the installation of new water meters. They are expected to bring in revenue amounting to $1.5 million a year and, at the same time, to cut down on water wastage.

International briefs . . .

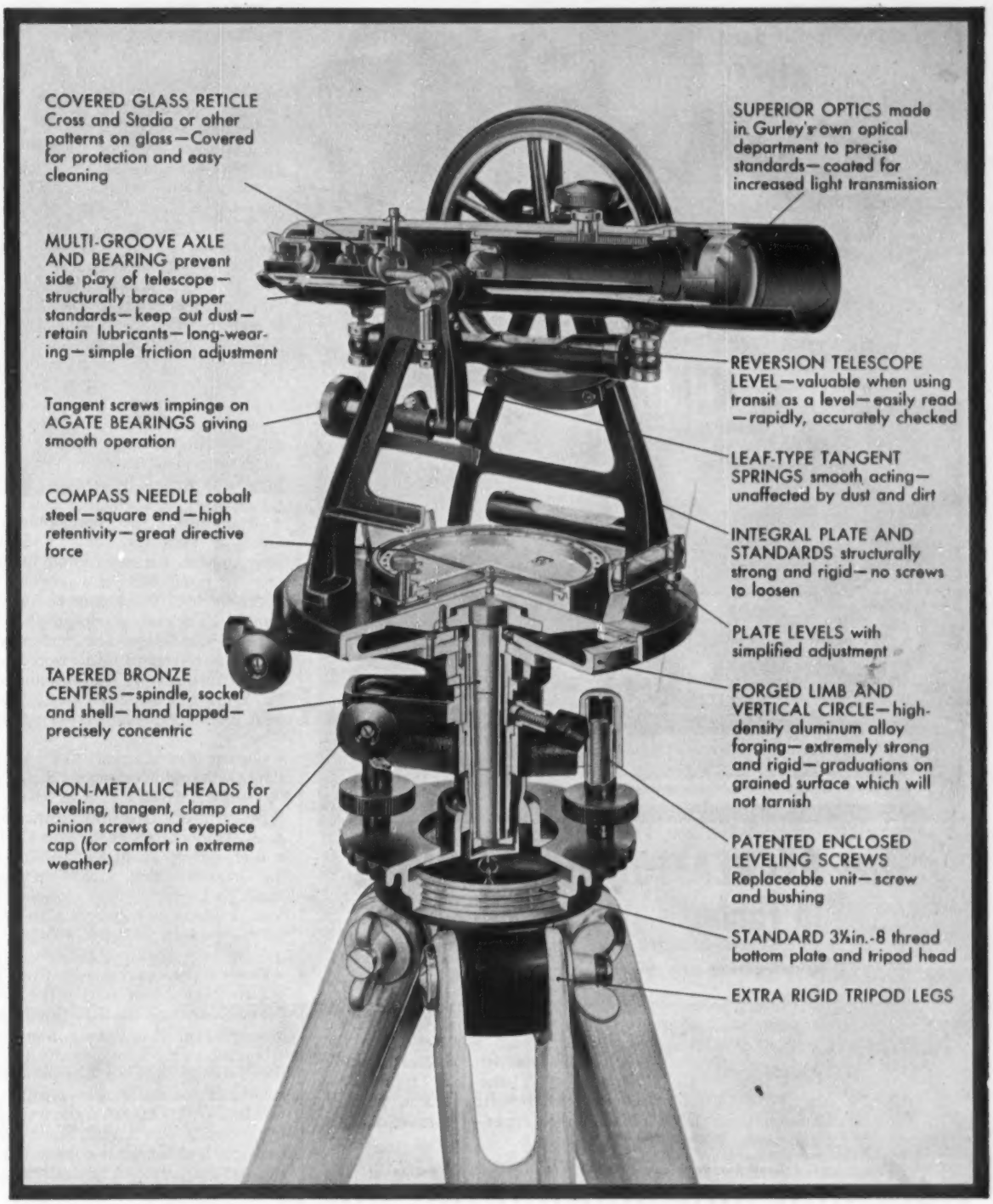
• **New NATO construction** – The North Atlantic Treaty Organization will spend $252 million in Europe and Turkey this year—and $448 million more during 1955-1956—to build airfields, pipelines, naval facilities and radio aids for navigation. One $43.7-million program already under way covers construction of training facilities in six European countries. Bombing and gunnery bases will be set up, as well as areas for ground force training, anti-aircraft and tank gunnery ranges.

• **Archipelago airfields**—To take care of the increase in civil aviation activities, Indonesia will add 20 new airfields to its present system of 30. (Expansion example: the air fleet jointly owned by Indonesia and Royal Dutch Airlines recently added 14 passenger planes.) Fields are to be constructed at Tandjung Karang, Bengkulen and Sibolga (all of Sumatra); Pontinak (West Borneo); Solo or Surakarta (Central Java); Djailolo, Kendari, Palu, Poso and Gorontalo (all on Celebes).

• **Five-year plan**—British Columbia is launching a five-year school construction program (cost: $61 million) to provide classroom facilities for an estimated annual increase of 11,000 students. About $12.8 million is earmarked for work now in progress; $31 million, for projects approved last year; $17.2 million for new projects to be submitted to referendum votes this year.

• **British Columbia cable**—By 1956 British Columbia Electric Co. plans to have a $5-million, 19-mi submarine cable in operation between the British

(*Continued on page 78*)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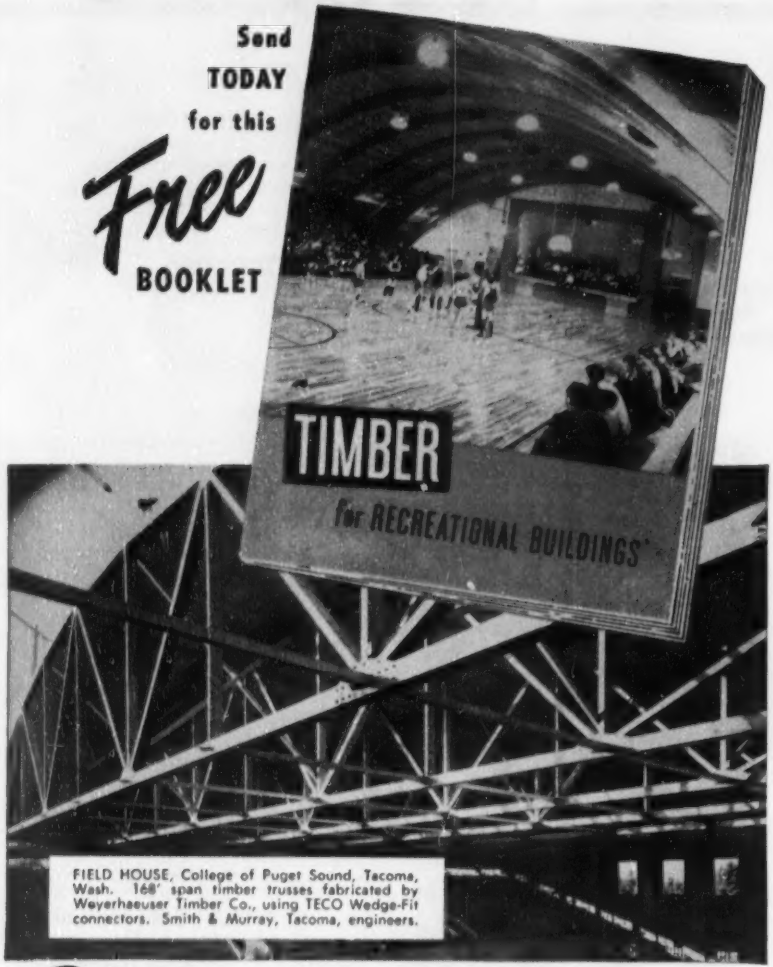

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ENR-543

INTERNATIONAL

Columbia mainland and Vancouver Island. This 132-kv cable is of a new type, claimed to be the first to use gas as its main insulating agent. The British firm that developed it plans a similar line between England and the European continent under the English Channel.

• **Changing pipeline's course**—Diversion of the blocked Kirkuk-Haifa pipeline to a new terminal on the Lebanese coast is going to be carried out by the Iraq Petroleum Co. (The line originally was built to feed the refinery at Haifa, but since 1948 Arab Iraq has stopped movement of oil to Israel.) The change in route involves construction of a 20-in line from Mafraq, Jordan, through Syria to Lebanon. It will tie in with two smaller lines from Kirkuk to Mafraq.

• **Groundwork for development**—Gibbs & Hill, Inc., New York and Los Angeles, has been hired to look into the possibilities of a program for hydro-electric development in Colombia. The firm—cooperating with French and Colombian engineers—will study emergency plans worked out by the Instituto de Aprovechamiento de Aguas y Fomento Electrico and will recommend a long-range scheme.

• **Capital for Ceylon**—The World Bank will lend Ceylon $21.8 million to meet foreign exchange costs of stage two of its hydro-electric program. Under terms of the loan Ceylon will (1) put up about $9.6 million for the domestic costs, including wages, local labor and building material; (2) form a statutory corporation to manage the project.

• **Power program progresses**—Plans for construction of four units of the Santa Maria System of the Rio Bonito hydro-electric plant in Brazil will proceed as a result of a $3.2-million loan from the National Bank for Economic Development. Total power production will be 237,000 hp when the units are completed at Rio Bonito, Suica, Timbau Seco and Santa Leopoldina (all in the east coast state of Espiritu Santo).

• **Public works projected**—The government bank for the development of Puerto Rico has issued $10 million in revenue bonds to finance a public works construction program. Here's where the money will go: $4 million for primary and secondary roads, and for urban highways; $250,000 for municipal roads; $1.6 million for sewer systems; $4.1 million for a central market.

Armco Perforated Pipe distributed along trench.

Workers set 20-foot section into place.

Simple bolted coupling bands speed up joining.

Backfilling follows right away. No waiting.

Perforated Pipe Job Goes Fast On Turnpike Project

Armco Perforated Pipe simplifies the job of getting rid of troublesome subdrainage water. And it's so easy to install!

The West Virginia Turnpike Project was no exception. The photos above show the four steps in installation. First, the pipe was distributed along the subdrainage trench; then construction workers lifted the pipe into position and added bolted coupling bands. Backfilling followed immediately, and the whole job hurried to completion.

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Why not consider the time, labor and money-saving advantages of Armco Subdrainage Pipe for your next job? Diameters range from 6 to 21 inches. Write for details. Armco Drainage & Metal Products, Inc., 1714 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

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Membrane filter

MF and MPN water analysis methods compared

Will the newly development membrane filter replace standard MPN (most probable number) procedures of examining water for bacteria?

It is expected that the filter, with its advantages of speed and convenience (ENR May 15, 1952, p. 28), will be included as a tentative method in the forthcoming 10th Edition of Standard Methods for the Examination of Water and Sewage.

The method recommended will have developed out of a one-year comparative study of MF and MPN procedures under auspices of the American Public Health Association, the American Water Works Association and the U. S. Public Health Service. A report of that study was presented to last fall's APHA convention in New York and is scheduled for the March edition of the AMERICAN JOURNAL OF PUBLIC HEALTH.

Paul Kabler, chief of the bacterial section, research and development branch, at Cincinnati's PHS laboratories authored the report and has this to say of its content:

• **It was cooperative**—The sanitation laboratory services of the California State Department of Health, Georgia State Department of Public Health, Indiana State Board of Health, Kansas State Board of Health, Massachusetts State Department of Public Health, New York State Department of Health, Ohio State Department of Health, West Virginia State Department of Health, and the city of Chicago Board of Health participated in this study.

Results of the study were tabulated separately for each of three periods: July 1 to Dec. 31, 1952; Jan. 1 to Mar. 31, 1953, and Apr. 1 to June 30, 1953. This was done because of certain variation in selections of source and volume of water samples examined, procedure, and media—factors remaining reasonably constant during each period of study. The number and percentage of samples showing agreement and disagreement were calculated for each kind of water source and each participating laboratory.

Results of the MF and MPN procedures were compared on the basis of the 95 percent confidence limits of the most probable number. The 95 percent confidence limits of a determinate 5-tube three dilution test are roughly 0.3 to 2.9 times the calculated MPN. Results by the MF technique that fell within these limits were considered in agreement with those of the MPN procedure.

• **It was broad**—Altogether, 1,706 water samples were examined from 17 categories of ground and surface sources. The largest numbers of samples were from wells and rivers. During the first period of the study (July 1 to Dec. 31, 1952), 68% of 682 samples showed agreement of results by the two methods. In the period Jan. 1 to Mar. 31, 1953, there were 79% agreements. During the last period (using BGF media instead of EHC Endo as in the first two), 75% agreements were reported. For the entire study agreements by the two methods were 74%.

Results were also tabulated in four groups based on the coliform content of the samples: (1) Samples showing determinate results which agreed within the limits defined; (2) no coliform organisms demonstrated by one test, while simultaneous examination by the other procedure showed coliform organisms present; (3) no coliforms demonstrated by either procedure; and (4) MF and MPN results of definitive value, and the MF results fell outside the 95% confidence limits of the MPN. These results showed that the confirmed MPN procedure gave positive results for coliform organisms somewhat more frequently than the MF technique. Of 650 samples having a coliform content in the range of potable waters, 571 (88%) showed results in agreement by the two tests.

There was an apparent increase in the agreement of results during the first six months of the study and little variation during the months January through April of 1953. Because of some increases in disagreements in May and June, the effects of seasonal variation must be considered.

There was no readily apparent relationship between the agreement of results by the two tests and any observed chemical or physical characteristic of the water samples examined except that turbidity tended to limit the volume of samples that could be examined by the MF procedure. When sufficient suspended material was deposited on the membrane, confluent growths of bacteria occurred which inhibited or eliminated sheen development by the coliform organisms.

The MF method to be included in Standard Methods will recommend a preliminary incubation on enrichment medium; the use of modified Endo media or one of equivalent performance; incubation in an atmosphere of saturated relative humidity; a total incubation period (enrichment plus differential) of 20 to 22 hours; and counting of colonies under 10 to 15 diameters magnification.

(*Continued on page 82*)

Space heater generates power for circulation

A space heater, which generates its own thermoelectric power for forcing the hot air into circulation, has been devised by F. J. Bordt, associate professor of mechanical engineering at Rensselaer Polytechnic Institute.

The heater, through the patented thermopiles built into the walls of the combustion chamber, develops sufficient power to operate four small fans that exhaust the heated air. The electricity-generating thermopiles are made up of 2,400 thermocouples arranged on eight panels. Two panels generate 2½ watts for operation of each fan.

Each thermocouple consists of two small metal pins about the length of a kitchen match and about half the diameter. Each pin extends ¼ in. into the combustion chamber, runs through the ½-in. ceramic insulating wall that forms the combustion chamber and extends ¾ in. into the cold outside air. The hot end of the pin is stainless steel, the cold end is copper—the current flowing from the hot end to the cold.

ASTM Standards

Approval given several construction materials

Committees of the American Society for Testing Materials finalized work on new specifications of interest to the construction industry during ASTM Committee Week sessions recently in Washington, D. C.

A proposed tentative specification for structural steel for welding was approved by Committee A-1 on Steel. The new specification differs from commonly used A7 for structural steel in the limitations set on carbon and the requirements for tensile properties (ENR July 9, 1953, p. 26).

In recognition of the increased use of dry concrete mix materials in packaged form, Committee C-9 on Concrete and Concrete Aggregates authorized a subcommittee to study the development and possibly propose specifications.

Committee C-9 study groups completed work on proposed specifications for lightweight aggregate for insulating concrete and for fly ash for use as an admixture in portland-cement concrete. Also, readied for approval was a group of revisions of the standard specifications for ready-mixed concrete (C 94).

Use of aluminum foil in connection with gypsum lath was accorded recognition by Committee C-11 on gypsum. A revision of the specifications for gypsum lath (C 37) will include a requirement and test method for this material, the latter to include a determination of thermal properties.

A specification for what is now referred to as a brick-block clay unit was authorized for letter ballot by Committee C-15 on manufactured masonry units. This new building unit does not fall into the brick or tile classification because of its volume of voids and cross-sectional design.

A task group was organized by Committee C-15 to study need for a new specification for low-moisture volume-change type of concrete masonry units. It also will investigate the possibility of setting up different classes of blocks based on performance requirements.

Committee D-19 approved for letter ballot a revision of the method of reporting results of analysis of industrial water (D 596) and of the methods of sampling industrial water (D 510) and steam (D 1066). Revised methods would cover sampling at subatmospheric pressure.

New studies were initiated on the application of radioactive isotope tracer measurements to industrial water and industrial waste water problems, and on methods for performance testing of resin ion-exchange materials for industrial water treatment.

Sunlamp aids in building design

A new variant of the sun lamp has been built by Cornell's College of Architecture to simulate the position of the sun for any latitude, season and time of day. The college said architects could use the device for designing sun controls, for visualizing the sun's effect on housing projects and buildings and for solving other problems. Called the solatron by college officials, the machine consists of two parts—a table with a revolving top marked into 360 deg and a graduated quarter-circle metal frame. Positions of the lamp and table top are determined for each test with a simple computing device. The solatron was designed by Prof. F. W. Edmondson and built by R. M. Matyas.

Portable testing machine

Structural research may be carried out more expeditiously in the future as a consequence of the development of a system of testing large-size structures with portable equipment by the Princeton, N. J., Building Research Laboratories of Southwest Research Institute. The equipment, consisting of tension rams, which are connected by high-pressure flexible hoses to hydraulic pumps, can be transported in a station wagon.

Jacks are manifolded together so as to apply equal pressure within predetermined loading zones. Loading is controlled at the pumps, where fluid pressures are read on calibrated gages. The jacks are connected to the structure through adjustable chains and turnbuckles.

This apparatus has been used for testing a new-type military shelter, a 40-ft steel truss and a 20-ft wide steel bent. It was possible to apply to the military shelter simulated wind and snow loads in such a way as to duplicate loading methods used in the Navy testing station at Port Hueneme (ENR Jan. 3, 1952, p. 30). Total cost to the sponsor was only a small fraction of the cost of reproducing the Navy facility.

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With 150 HP available at the drawbar, the new D8 offers new standards of track-type tractor power, production and value.

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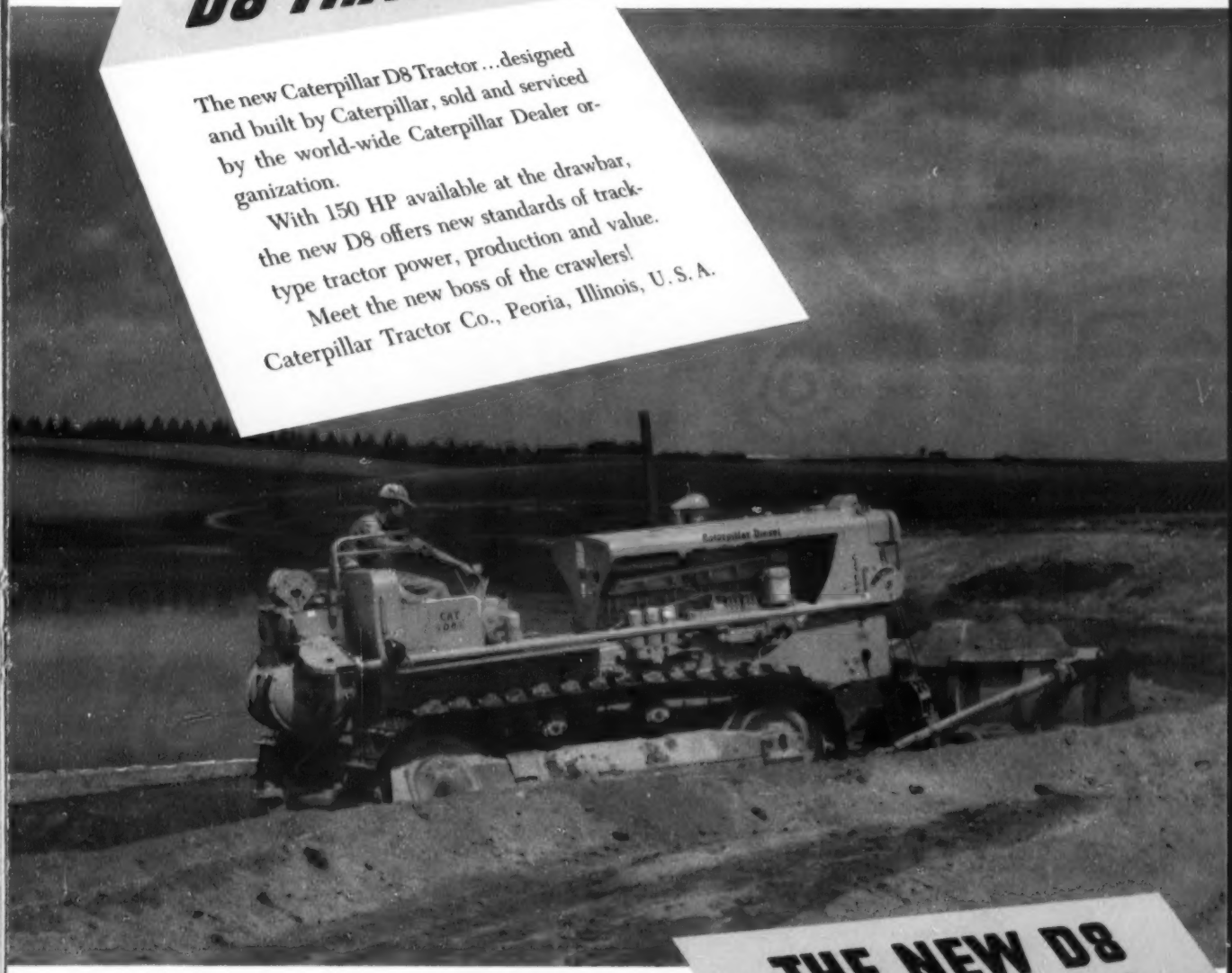
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



THE NEW D8 Boss of the Crawlers

- The new D8 has more drawbar horsepower...horsepower that works for you.
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- The new D8 is versatile...matched to Caterpillar-designed Bulldozers, Scrapers, Rippers and Pipe Layers.
- The new D8 is also a pusher...available attachments make this machine a powerful push tractor.

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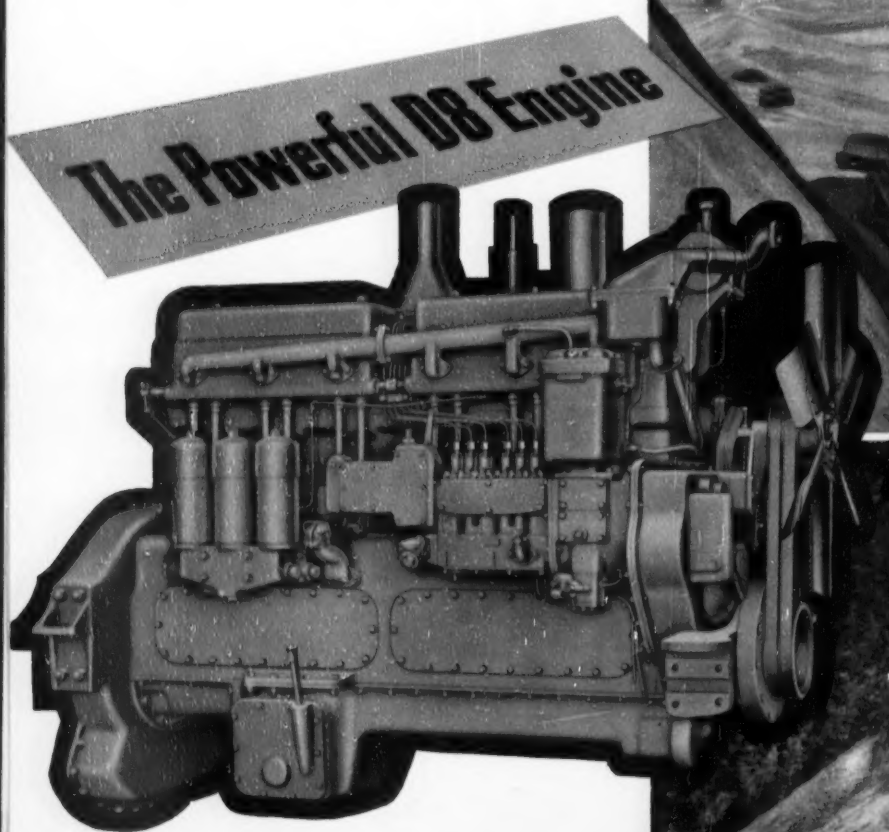
The new high performance of the Caterpillar D8 Tractor stems from the 185 HP, 1200 RPM diesel engine. Important new features, built into the time-tested and job-proved Caterpillar design, contribute to longer engine life and decreased operating costs as well as higher power. Some of these features are: new cylinder head incorporating valve rotators and hardened valve seat inserts, new camshaft, aluminum alloy pistons with stainless steel heat plug in the high temperature zone and a cast-in iron band for the top piston ring groove. A larger oil pump driven from the front of the crankshaft has an exclusive throttling valve pressure control which assures correct lubrication for all moving parts from the first turn of the crankshaft.

This powerful engine, with these and many other advanced features, is one of the big reasons why the D8 gives you more value than ever before.



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Only Caterpillar offers you the long life and low maintenance cost of the oil clutch. The outstanding feature of this advanced clutch is that oil films absorb the friction and heat. The metallic friction surfaces do not come into contact until the last revolution or two before engagement. The clutch has its own lubrication system with gear-type pump and suction screen. The pump supplies oil under pressure to the hydraulic booster, which makes the clutch exceptionally easy to operate. Oil is also delivered to the inner diameter of the three clutch plates. This continual lubrication and cooling is the principal reason for much longer periods between adjustment and replacement than is possible with the conventional dry clutch. The oil clutch is another big reason why the D8 is a better buy.

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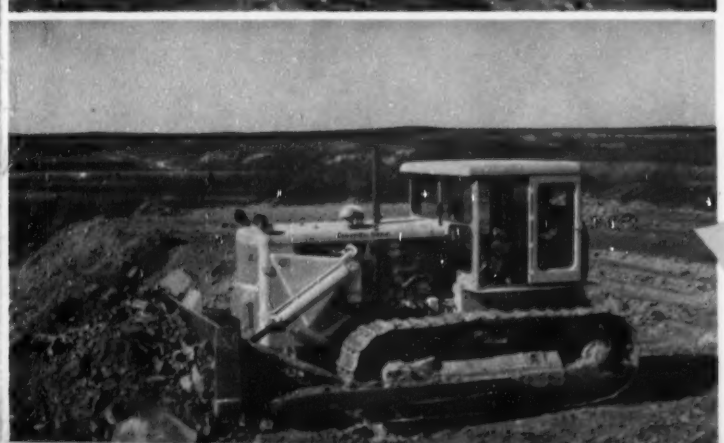

Caterpillar

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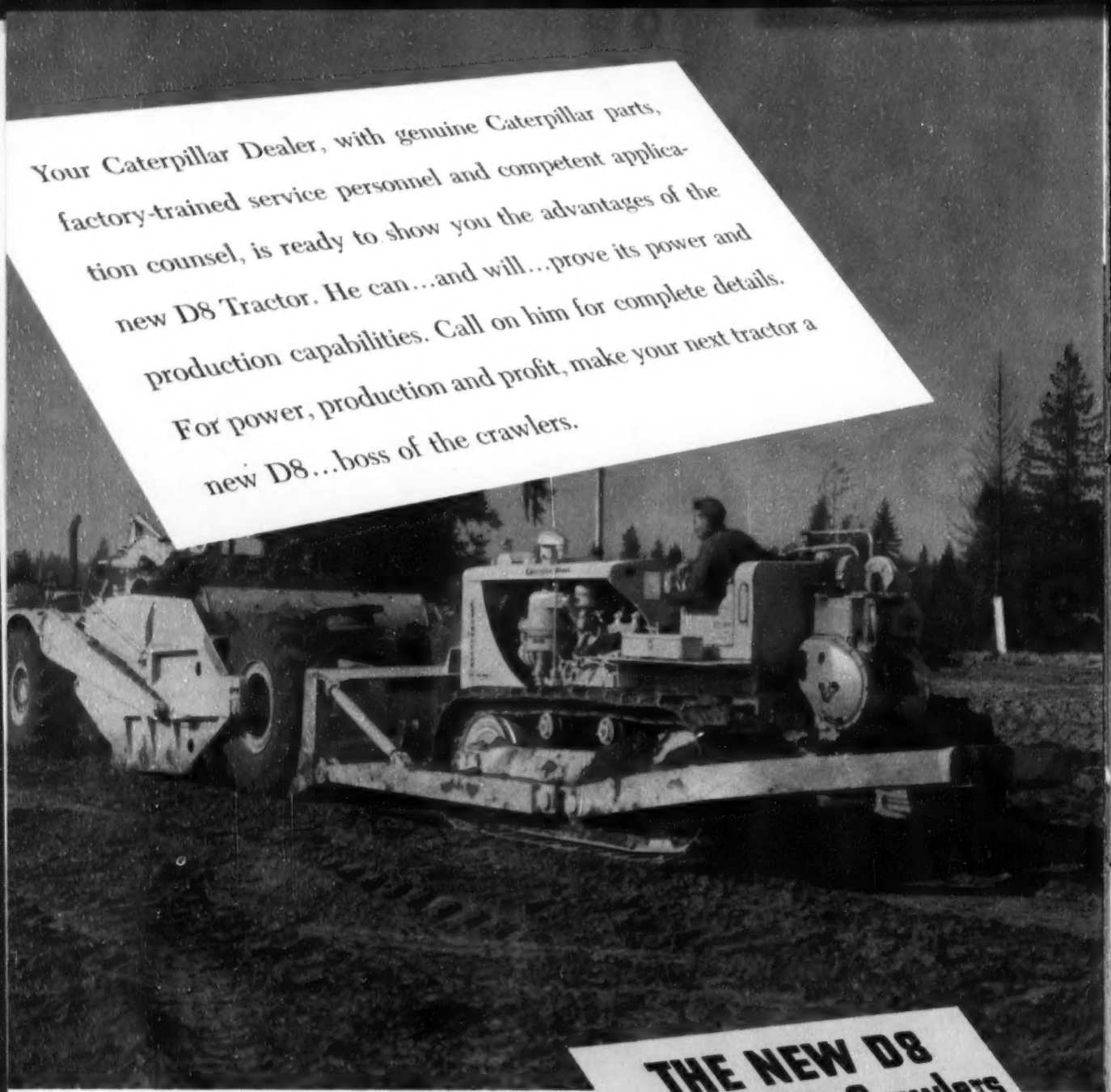
THE NEW D8 Boss of the Crawlers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Boss of the Crawlers

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The new Caterpillar D8 Tractor offers new highs in earthmoving production in push-tractor operations. The D8, equipped with No. 8S Bulldozer, heavy duty track roller guards, crankcase guard and tandem pusher frame, will cut your work cycles to a minimum.

Fast and maneuverable, the D8 applies a full 150 HP to the job of loading your hauling units in new record times. Push-loading, singly or in tandem, is provided to meet the conditions of your job.

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LEGAL

Owner waives no right by taking possession

"The courts of this state [Louisiana] have held that an owner is not estopped from claiming damages for the breach of a building contract by taking possession and moving into the building. The failure of the contractor to construct the building in accordance with the plans and specifications was a violation of the contract and the taking of possession of the premises by plaintiff cannot be considered as a discharge of the contractors' liability."[1]

As to the claim by the contractor that the owner by taking possession of and occupying the building waived his right to claim damages for alleged defective construction, the court referred to the legal definition of the term "waiver" as set forth in 56 American Jurisprudence, par. 12, page 113, as follows: "The essential elements of a waiver, within the definitions already given are the existence, at the time of the alleged waiver, of a right, advantage, or benefit, the knowledge, actual or constructive, of the existence thereof, and an intention to relinquish such right, advantage, or benefit, the knowledge, actual or constructive, of the existence thereof, and an intention to relinquish such right, advantage, or benefit. Voluntary choice is of the essence of waiver."

In the case above referred to, the owner claimed that at the time he took possession of the building, he did not have any knowledge of the defects.

(1) Michel v. Efferson, 65 So. 2d 115, Supreme Court of Louisiana, Nov. 1952 and numerous cases there cited.

Contractor implied warranty

A Virginia contractor entered into an agreement to furnish and apply to the exterior of a house a paint-like material that was advertised as a product that would seal, beautify and protect the surface of the building. Shortly after the work was completed, the color of the house began to turn from the original white to a dark color and dampness and mildew started to appear both on the inside and outside of the house. Some of the wood trim started to rot.

The owner brought an action against the contractor to recover the damages sustained as a result of the defective work and obtained a recovery which was affirmed on appeal.[1]

(*Continued on page 88*)

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The contractor claimed that the damage was not caused by the paint job and that even if it were, there was no express warranty of the quality of the paint. As to the first point, the owner produced experts who testified that the damage was caused by the paint job. It was also shown that the owner had lived for four years in the house where the work had been performed and that the condition complained of did not arise until after the paint job was done. The contractors also produced expert witnesses who testified that the damage did not result from the paint job. Under these circumstances, the cause of the damage was a question of fact to be determined by the jury and the jury having found in favor of the owner, the appellate court, when presented with the case, would not reverse such finding.

Concerning the claim that there was no express warranty as to the quality of the work, the appellate court in its opinion stated: "The defendants [contractors] made no express warranty in their contract for applying the material, but they were bound by an implied warranty that it was reasonably fit for the purpose for which it was applied. Du Pont de Nemours & Co. v. Universal Moulded Prod., 191 Va. 525, 566, 62 S.E. 2d 233, 352. If its use on the plaintiff's [owner's] house brought about the conditions of mold, discoloration and deterioration shown by the evidence, then there was a breach of this implied warranty and defendants are responsible for the damage."

(1) Swersky v. Higgins, 76 S. E. 2d 200, Supreme Court of Appeals of Virginia, June 8, 1953.

Failure to read contract

A recent court decision in New Jersey restates a well established principle relating to unread contracts.

"It has been held in our state [New Jersey] that the fact that plaintiff did not choose to read the contract, or the material parts of it before signing it, or did not know its contents at the time, cannot, in the absence of actual fraud, relieve her of its obligations. This doctrine arises from the well-settled principle that affixing a signature to a contract creates a conclusive presumption, except as against fraud, that the signer read, understood, and assented to its terms."[1]

(1) Wade v. Park View, Inc., 96 A. 2d 459, Camden County Court, New Jersey, March 17, 1953 and numerous cases there cited.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

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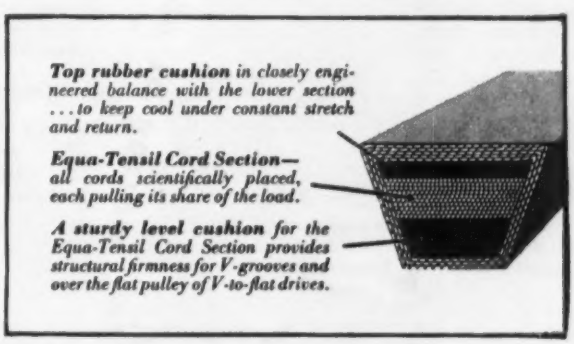
***Top rubber cushion** in closely engineered balance with the lower section ... to keep cool under constant stretch and return.*
***Equa-Tensil Cord Section**— all cords scientifically placed, each pulling its share of the load.*
***A sturdy level cushion** for the Equa-Tensil Cord Section provides structural firmness for V-grooves and over the flat pulley of V-to-flat drives.*

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FLAT BELTS AND BELTING • SPECIAL PURPOSE BELTS

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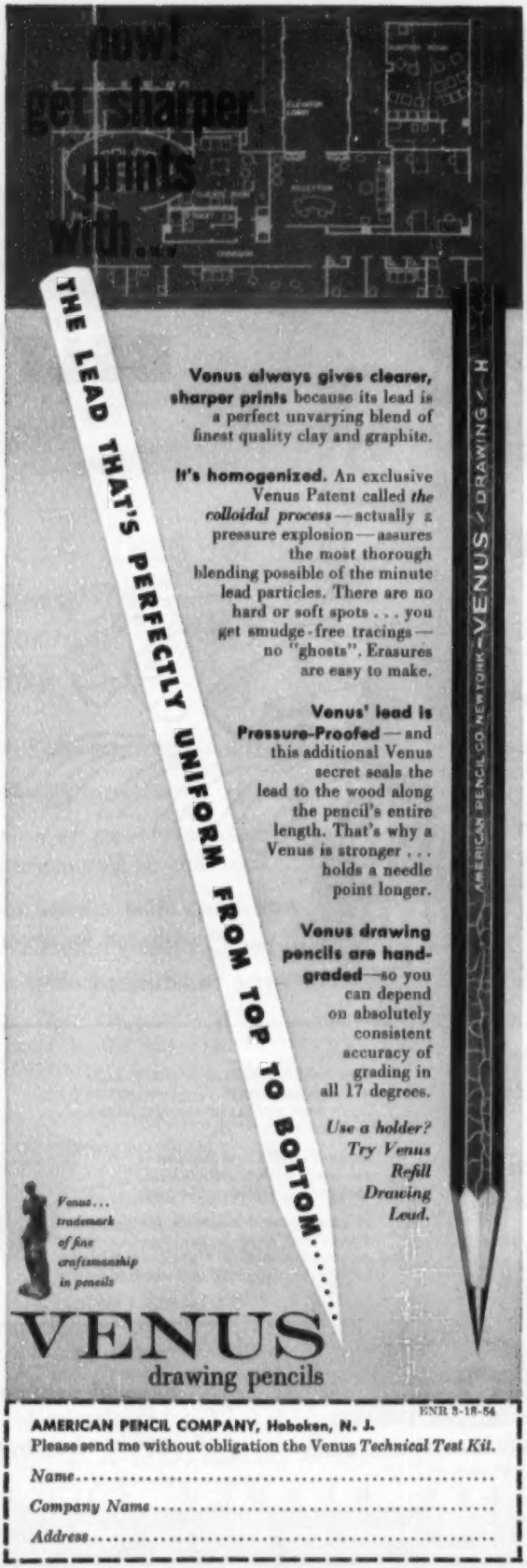
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THE LEAD THAT'S PERFECTLY UNIFORM FROM TOP TO BOTTOM.....
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Venus always gives clearer, sharper prints because its lead is a perfect unvarying blend of finest quality clay and graphite.
It's homogenized. An exclusive Venus Patent called the colloidal process—actually a pressure explosion—assures the most thorough blending possible of the minute lead particles. There are no hard or soft spots . . . you get smudge-free tracings—no "ghosts". Erasures are easy to make.
Venus' lead is Pressure-Proofed—and this additional Venus secret seals the lead to the wood along the pencil's entire length. That's why a Venus is stronger . . . holds a needle point longer.
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MEN AND JOBS

Careers . . .

• **Manila mission**—Two Reclamation Bureau engineers have left for Manila on a 90-day assignment with the Foreign Operations Administration. W. Bion Moore (from the planning section of the Amarillo, Tex., office) and Oliver C. Reedy (a planning engineer at the Billings, Mont., office) will advise Philippine officials on a plan to integrate various parts of the Marikina River project near Manila.

• **Toll road aides**—The Indiana Toll Road Commission has appointed two aides—one to direct public relations and the other for general duties. Arnold R. Daum, a public relations specialist for the American Petroleum Institute in New York, will take over the press work. Charles W. Keating, real estate and insurance broker of Evansville, will assume general duties

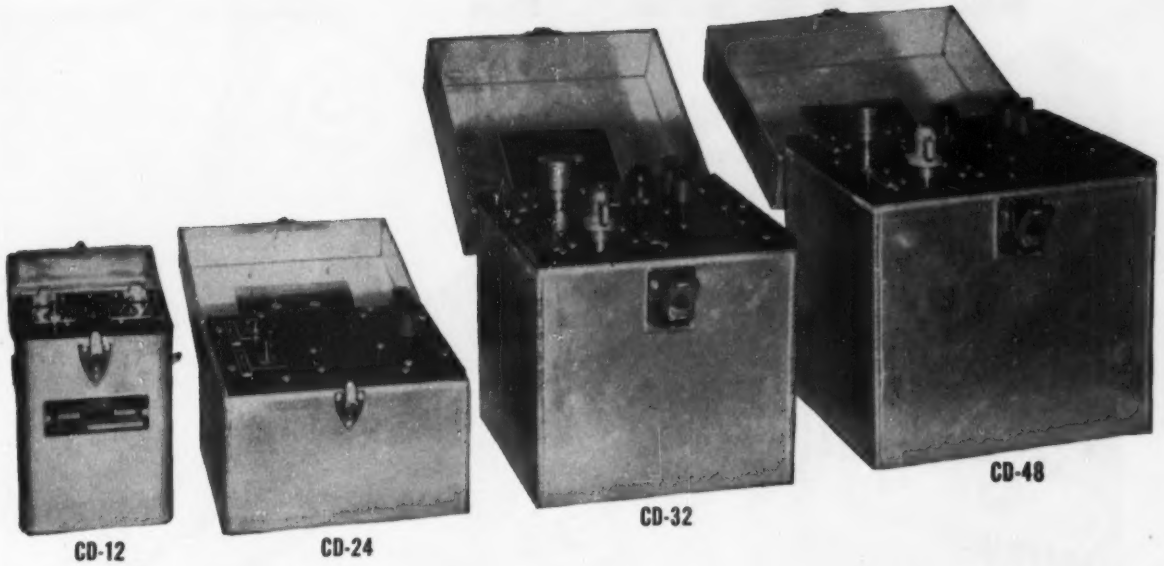
• **Organization's new officers**—J. Norman Pease, of Charlotte, has been named president of the North Carolina Society of Engineers. Other new officers are Howard B. Hicks, of Raleigh, first vice-president; Hal S. Crain, of Durham; second vice-president. New district directors: R. A. Ashworth, of Wilmington; L. H. Gunter, of Raleigh; Arvin Page, of Winston-Salem; and Vincent Maclary, of Asheville.

• **Engineering award made**—The annual science and engineering award of Drexel Federation of Engineering Societies has been presented to John McShain, head of the contracting firm bearing his name. The award was made at the annual engineer's day ceremonies at Drexel Institute of Technology, Philadelphia.

• **Contractor-college trustee**—Harold A. Putnam, building contractor and former mayor of Potsdam, N. Y., has been elected a trustee of Clarkson College of Technology, Potsdam. He is president of Putnam-Hawley Construction Co. and Putnam-Hawley Building Materials Co., as well as vice-president of the Raquette River Construction Co. currently building seven dams on the Raquette River for the Niagara-Mohawk Power Co.

• **AGC branch officers**—The Associated General Contractors of Missouri has announced its officers for 1954. President is H. W. Masters, president of Masters-Jackson Paving Co., Spring-

(Continued on page 95)



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You can fire any conceivable type of blast . . . large or small . . . on the surface or underground . . . with maximum safety, efficiency and economy with Du Pont CD (Condenser Discharge) Blasting Machines—newest development of Du Pont Explosives Research.

Du Pont CD Blasting Machines offer a simple and satisfactory method of firing either primary or secondary blasts. These four lightweight, portable power sources have capacities ranging from 20 holes in straight series to 1200 holes in parallel series. Safety is greatly increased with Condenser Discharge Machines because power *cannot* reach blasting circuits except by the deliberate action of the operator.

These machines eliminate maintenance of permanent firing lines and dependence on motor generators. They have no moving parts, require no physical effort as with mechanical-type machines, and are extremely easy to operate. Long-lasting radio-type B batteries charge the condensers, light up a pilot lamp when they're fully charged. Shots are fired only by turning on a firing switch. Terminals are dead until the instant of firing.

It's easy to fire large or small shots with maximum safety using Du Pont CD Blasting Machines. Ask the Du Pont Explosives representative in your area for complete information about them. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

Characteristics of Condenser Discharge Blasting Machines

Model	Rated Voltage	Capacity with Leading Lines Not Exceeding 3.0 Ohms Resistance			
		Straight Series		Straight Parallel	Parallel Series
		Primary	Secondary		
CD-12 Weight 4 lb Width 4 in Length 5¼ in Height 7 in	120	20	30	NR*	NR*
CD-24 Weight 12 lb Width 7½ in Length 8¼ in Height 6½ in	240	50	75	NR*	240 (6 series of 40 each) (8 series of 30 each)
CD-32 Weight 22 lb Width 9½ in Length 9½ in Height 10½ in	320	50	125	30	480 (10 series of 48 each) (12 series of 40 each)
CD-48 Weight 27 lb Width 9½ in Length 11 in Height 12¼ in	480	50	200	60	1,200 (24 series of 50 each) (30 series of 40 each)

*NR means not recommended for the purpose.

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

The story
of a building
with . . .

"FIRM FEET" IN CLAY

Case history
of CECO on-the-job
performance

HOW CECO JOIST CONSTRUCTION HELPED SAVE $4.00 PER SQUARE FOOT

Erecting a building with firm footings in downtown Chicago clay is no simple task. Accomplishing that, plus cutting costs, is truly a stand-out feat.

Such is the story of the Remington Rand Chicago Office Building and the problem solved by Architects Bartlett, Watts and Rosene.

Analysis indicated that usual column spacings would impose excessive pressures on the subsoil, causing piles to drift. The solution: increase the distance between pile groups and spud every third pile.

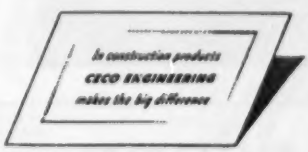
But that created a problem . . . how to span the wider bays economically and keep the dead load on each pile group to a minimum. The architects knew Open-Web Steel Joists offered the lightest floor system, so called for their use.

Conduit and air-conditioning ducts were run through the open webs, resulting in further economies.

"Being self-centering and requiring no shores, Steel Joists were fast to erect," said Architect Harry Owen Bartlett. "Thus the contractor, J. L. Simmons Co., Inc., was able to pour slabs early, allowing masonry units to be stored on the floors and then laid up from inside, saving scaffolding."

Total cost of the building was $13.75 a square foot, compared to some comparable buildings costing $17.75—a saving of $4.00. Here is another example of Ceco performing on the architect-owner-contractor-supplier team.

Ceco Product Specialists will help you save through product engineering. So before you plan your next project, call your nearest Ceco office. Consult Sweet's file for address. CECO



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EASY ALIGNMENT!

Pipe deflections—resulting from varying flange thicknesses and restricted bolt play—presented no problem to engineers designing Cleveland's 22 million dollar Nottingham Filtration Plant. In joining cone valves to a 36″ wash water line, for example, they specified Dresser Couplings which permit up to 3° deflection, yet maintain watertight joints.

In addition, Dresser Couplings provide easy entrance into the line, simplify maintaining and replacing the valves.

For information on Dresser Coupling applications that may suggest new solutions to old problems—help you get a *superior* job on water, sewage and industrial waste projects—contact your local piping supply house or write us.

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Dresser Manufacturing Division, 319 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). Warehouses: 1121 Rothwell St., Houston; 101 S. Airport Blvd., S. San Francisco. Sales offices also in: New York, Philadelphia, Chicago, Toronto.

field; vice-president, Dale W. Maxwell, Maxwell Bridge Co., Columbus, Kan.; treasurer, E. W. Menefee, president of W. J. Menefee Construction Co., Sedalia, Miss.; secretary and manager, E. C. L. Wagner; assistant manager, J. George Robinson.

• **Photogrammetry president**—Arthur C. Lundahl has been installed as president of the American Society of Photogrammetry. Now adviser to the director of naval photography, he has served at the naval photographic intelligence center at Anacostia as head of the photogrammetry department and as assistant engineer. Other new officers of the aerial mapping organization include W. Sidney Park of Louisville, first vice-president, and Robert N. Colwell of Walnut Creek, Calif., second vice-president.

• **Departs from du Pont**—Edward B. Showell, consulting engineer on water and industrial wastes problems, has retired from E. I. du Pont de Nemours and Co. after 35 years service. He intends to continue consulting in his specialty from his residence in Chadds Ford, Pa.

• **Engineering dean named**—Prof. Edward McHugh has been appointed dean of the school of engineering at Clarkson College of Technology, Potsdam, N. Y. He is also director of the college's division of industrial research and chairman of the mechanical engineering department.

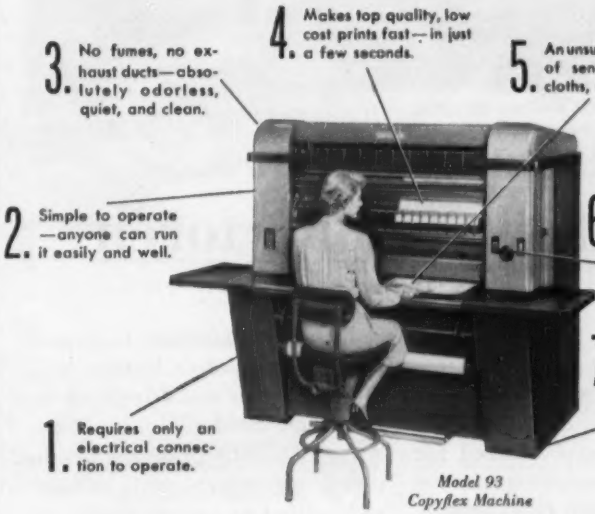
• **Alaskan assignment**—L. E. Hough, who resigned as city engineer of Aberdeen, Wash., last summer, has accepted a resident engineering job with the Alaskan Road Commission. He will be stationed first at Juneau, later in the Mt. McKinley area.

• **Construction company change**—Allen D. Christensen has been elected president of the Utah Construction Co., Salt Lake City. He also becomes president and general manager of Marcona Mining Co., in Peru, (a subsidiary of the firm). Former president Lester S. Corey is now civilian consultant to the assistant secretary for defense.

• **Directs industry relations**—Associated Equipment Distributors has announced the appointment of Frank Skidmore as director of industry relations. This is a new position, created as part of an enlarged program of industry relations and membership services. Skidmore was formerly sec-

(Continued on page 96)

Seven Good Reasons for Specifying Copyflex for Your Next Copying Machine


3. No fumes, no exhaust ducts—absolutely odorless, quiet, and clean.
4. Makes top quality, low cost prints fast—in just a few seconds.
5. An unsurpassed variety of sensitized papers, cloths, and films.
2. Simple to operate—anyone can run it easily and well.
6. Precision engineered for a lifetime of trouble-free service.
7. No permanent installation involved—mounted on casters for mobility.
1. Requires only an electrical connection to operate.

Model 93 Copyflex Machine

Why settle for less when it costs no more to own the one machine that offers *all* the benefits of diazo type, positive black-on-white reproduction?

That's what you get with a Bruning Copyflex. You have all the speed, the economy, and the quality associated with positive black-on-white reproduction . . . plus problem-free installation, ease of operation, and absence of fumes, exhaust ducts, ventilating fans, and similar drawbacks.

Today's Copyflex machines represent 25 years of development by men who are thoroughly familiar with engineer prints and print-making requirements. They are made by the Charles Bruning Company, who introduced the diazo type direct process of reproduction in this country in 1929.

There is a Bruning Copyflex that will exactly fit your requirements. Write us for full particulars.

BRUNING *Copyflex*

Copies anything typed, written, printed or drawn on ordinary translucent paper—in seconds.

CHARLES BRUNING COMPANY, INC. • 4700 MONTROSE AVENUE • CHICAGO 41, ILLINOIS

Everything for the Engineer and Draftsman

The tractor that burned like a blowtorch

(A true story, based on Hartford File #74651)

Our business is clearing land, so tractors are our bread and butter. We use five. One, fitted with angle dozer and power unit, had just been overhauled. It was insured for $16,000. Our driver, an experienced man, was pushing his job at a steady pace when *whoosh* — the whole machine flashed into a blaze.

It came so fast he was burned about the face before he could jump from the seat. He emptied his fire extinguisher at the flames, but in a minute or so came *whoosh No. 2.*

Our adjustor reconstructed what happened. The first flash, he figured, came from gasoline leaking from the starter tank and dripping on to the hot manifold.

The second blaze came when the tank of diesel fuel split in the heat and spilled 85 gallons under the tractor. It burned like a blowtorch, and melted all the small parts off of the machine.

Repairs came to $11,706. That was the amount we were paid by the Hartford Fire Insurance Company under our Contractors' Equipment policy.

Contractors' equipment, even the heaviest, can be damaged in many unexpected ways. A Contractors' Equipment policy protects you against fire, collision, theft, windstorm, landslide and other specific hazards. And protects equipment in transit, in storage and in use.

Ask your Hartford Fire Insurance Agent, or your insurance broker, to quote rates and outline the actual, detailed protection offered you in a Contractors' Equipment policy. You'll be surprised by the broadness of its coverage and its reasonable cost.

Year in and year out you'll do well with the

Hartford

Hartford Fire Insurance Company • Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company • *Hartford 15, Connecticut*

MEN AND JOBS

cretary-treasurer and general manager of Contractors' Equipment & Supply Co., Albuquerque, N. M.

• **Power expert's project**—William L. Newmeyer, assistant chief of the Reclamation Bureau's power division in Washington, D. C., is en route to Uruguay on a 30-day detail. He'll advise Uruguayan officials on the proposed Rincon de Baygorria hydro-electric project on the Rio Negro. On his return, he will join the staff of the Bureau's assistant commissioner in Denver as chief of the power operations division.

• **Heads Colorado contractors**—Walter Schmidt of Grand Junction, Colo., president of the Schmidt Construction Co., has been named president of the Colorado Contractors Assn. He replaces C. L. Hubner, who was elected to the board of directors.

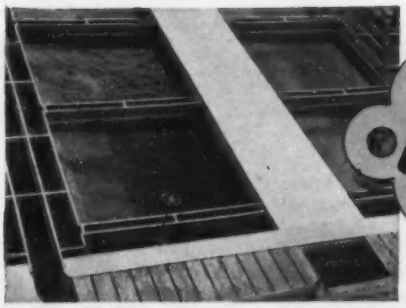
• **Engineers election**—The new president of the Maryland Association of Engineers, Inc., is James H. McKay, Baltimore city highways engineer. Other officers are: W. R. Kahl and A. L. Grubb, first and second vice-presidents, respectively; L. B. Kravetz, executive secretary; C. J. Lortz, treasurer; J. W. Reuder and H. L. Hobbs, field secretaries; Ben Dyer, (retiring president) Walter C. Hopkins, J. V. Derrenberger and J. D. Long, directors.

• **Retires from railroad**—After 40 years service with the Seaboard Air Lines Railroad, Valuation Engineer Thomas W. Roby has retired. He joined the company in 1914 as assistant engineer in the newly formed valuation department. The assistant valuation engineer, Jean Jones, will take over the job.

• **Society leader**—B. P. Barber, of Barber Keels & Associates, Inc., Columbia, Ga., has been elected president of the South Carolina Society of Engineers. A. L. Atkinson, Greenwood, was named vice-president. A. E. Johnson, Columbia, was re-elected secretary-treasurer.

• **Becomes bridge engineer**—A. D. Newbold has been appointed acting bridge engineer for the Colorado highway department, replacing Paul S. Bailey, who retired after 31 years of service. J. A. Solomonson has been appointed engineer for the Pueblo district, and J. E. Casey, engineer for the Durango district. R. B. Dudley is the new district construction engineer Alamosa.

4 KEYS TO BETTER WATER

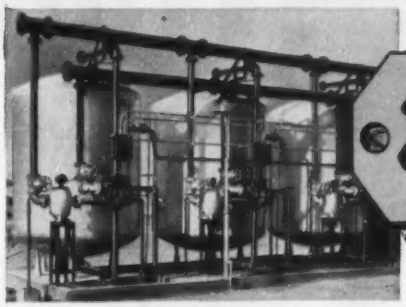


1. PRECIPITATORS

PROBLEM: Turbidity, Color, Hardness, Iron, Alkalinity

PRECIPITATORS remove dirt, color, hardness, iron, alkalinity, silica, fluorides, taste, odor by coagulation, precipitation, and settling. Fully utilize the Permutit sludge-blanket principle for big savings in space . . . chemicals . . . time!

Horizontal or vertical designs of any capacity. Tailor-made units to *triple* capacities of old-fashioned settling basins.

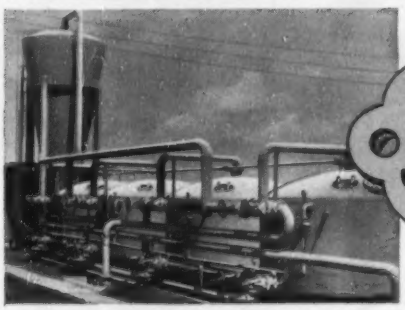


2. SOFTENERS

PROBLEM: Hardness with Some Iron, Manganese

SOFTENERS quickly reduce hardness to zero . . . while removing troublesome iron and manganese. Simplest method. Gives positive results with no waste disposal problem. Features ease of operation, low installation and operating costs.

Pressure or gravity units or batteries—any capacity. Permutit automatic controls give uninterrupted supply of softened water, save operator's time, increase efficiency of old plants.



3. SPIRACTORS®

PROBLEM: Hard, Clear Water

SPIRACTORS soften on new principle—*catalytic precipitation*. Hard water and lime-soda swirl upward through catalyst granules. Precipitates deposit by accretion, fall to bottom, are easily disposed of. Water at top is soft, clear, ready for filtration. *Total reaction time is eight minutes.* Lime treatment with no bulky sludge disposal problem.

4. FILTERS

PROBLEM: Traces of Dirt, Oil, Iron

FILTERS trap the last traces of suspended impurities, deliver a crystal-clear effluent. Permutit rapid sand filters are available in vertical or horizontal steel shells, and gravity types in wood or concrete. These units feature Permutit automatic controls. Wash, rewash and return to service—with no operator present!

FREE WATER ANALYSIS! Write today for free bulletins on these or any other water conditioning processes. Permutit will analyze your water supply, make recommendations without obligation. THE PERMUTIT COMPANY, Dept. ENR-3, 330 West 42nd Street, New York 36, N. Y.

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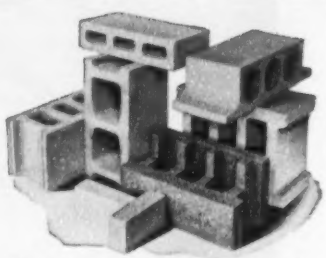
WATER CONDITIONING HEADQUARTERS FOR OVER 40 YEARS

Whatever You Build ...Build it Better with VIBRAPAC Block

Perform Modern Masonry Miracles on Both Exteriors and Interiors

A half century of scientific progress in quality control has won universal respect for VIBRAPAC Block. The functional qualities of these Modern Masonry Units, plus their wide range of practical adaptability, have inspired the most advanced creative construction. Many years of research have paved the way for lightweight aggregate and perfected VIBRAPAC manufacturing processes. As a result, structural loads are reduced without sacrificing rugged, constructional security. Firesafety — stormsafety — insulation against heat and cold — acoustical and soundproofing qualities — low initial cost — low upkeep. All these are added advantages. Yes, you'll be proud of the modern masonry miracles you can perform with VIBRAPAC Block.



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BESSER VIBRAPAC — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

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Ask for FREE copy of bulletin illustrating the complete line of standard modular building units available and giving technical guidance in their many structural uses. Contact your local VIBRAPAC Block Plant or write direct to the Besser Manufacturing Company, Box 181, Alpena, Michigan, U. S. A.

..a Half Century of Concrete Masonry Progress!

BOOKS

Principles of prestressing

PRESTRESSED CONCRETE—By Y. Guyon. 543 pp. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y.; $12.

The first volume of a comprehensive treatise on prestressed concrete, this book presents a thorough treatment of statically determinate straight beams. It has been translated into English from Guyon's "Béton Précontrainte," which was published by Edition Eyrolles in Paris in 1951. Since the translators established as their main object the presentation of the author's views and arguments, the text makes good reading.

The author's firsthand experiences with prestressed concrete, which have given him an excellent background in theory, design and construction, enable him to write authoritatively on all phases of the subject. He is an assistant of Eugene Freyssinet, noted French pioneer in the development of prestressed concrete. He is also a consulting engineer for engineering and contracting firms both here and abroad.

Incidentally, Freyssinet has written a foreword to the book that structural engineers will find well worth studying. It demonstrates prestressing as a principle rather than a technique.

Guyon opens his book with a discussion of general considerations, such as materials and methods, anchorages, fire resistance and friction between cables and enclosures.

In the second part of the book, he takes up the elastic design of simply supported beams. He analyzes quite thoroughly the problems involved for both beams with constant section and those with variable depth.

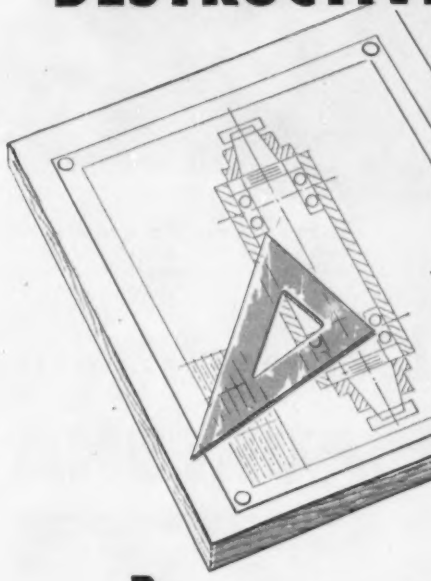
In the third part, he deals with tests of simply supported beams. He covers tests on members with tendons anchored at beam ends (post-tensioned) and with tendons anchored only by bond (pretensioned). He also discusses safety factors and elasto-plastic design.

While the treatment in this book is limited only to statically determinate straight beams, the scope of application is not limited necessarily to just this type of construction. Many of the principles presented are sufficiently general to apply to a wider variety of structures. Writes Freyssinet: "I am persuaded that any engineer who makes the effort to assimilate the substance of his [Guyon's] book will be able to construct not

(*Continued on page* 100)

Keeps

DESTRUCTIVE OLD AGE



away from your drawings

BY the time you discover old age has attacked your important drawings — it's too late. By then, the damage has been done. The time to effectively block old age is NOW — while tomorrow's drawings are still in the preparatory stage.

The way to do it? Specify Arkwright Tracing Cloth. Arkwright checks the destructive effects of old age. Arkwright won't fray at the edges, turn brittle or opaque. You are assured perfect transparency, regardless of age.

There are other reasons why it pays to work with Arkwright. This superior tracing cloth can "take" all the erasing you're likely to give it in a month of Sundays — and still provide sharp, clear lines. You need never worry about "feathering" or "blobbing" or imperfect blueprints.

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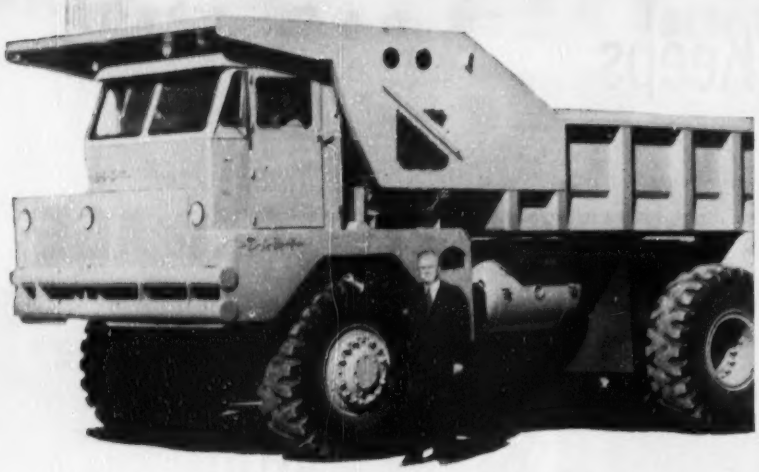
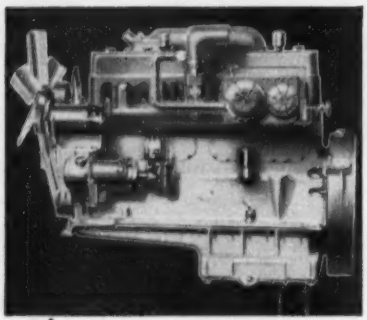


RALPH KRESS, Exec. V. P. & G. M. of Dart Truck Co., has created a heavy-duty truck of new design, Waukesha Super Duty Six powered

new design FOR HEAVY DUTY

POWERED BY WAUKESHA

Utilizing the full power of its Waukesha 6-WAKR Butane Engine for driving—the newly designed 30-ton Dart 35-SA End-Dump Truck is most unusual. All auxiliaries, including the cooling system, are driven by a smaller engine . . . a Waukesha 195-GKU. Mounting the engines amidships (centered between the wheels), and the wagon-type front axle, both exclusively Dart, give many advantages. Waukesha power means payload performance plus economy.



☆ Powering this Dart 30-tonner is this 6-WAKR Butane Super Duty Six — 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement, 290 horsepower at 1800 rpm

Super-Duty Six 1197 CU. IN. 6-WAK Series

- 6-WAK—Gasoline Engine
- ☆ 6-WAKR—Butane Engine
- 6-WAKDB—Diesel Engine
- 6-WAKDBS—Supercharged Diesel Engine

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Standard or Counterbalanced Crankshafts are available.
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BOOKS

only beams but structures far more complex, for he will find therein not only the knowledge of an engineer but an example of his essential virtues: probity, courage and faith."

Miscellaneous notes

• **The complete report** of the President's advisory committee on housing policies and programs has been published and is now available for $1 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The first 20 pages of the 375-page report contain the committee's recommendations (ENR Dec. 17, 1953, p. 22). The rest of the material—gathered by five subcommittees during a three months' study of the situation—covers FHA and VA housing programs; slum clearance, rehabilitation and conservation of housing and cities; housing credit policies; housing of low-income families; and organization of housing activities in the federal government.

• **The Port of Marseille** is the title of a new 300-page monograph that contains full technical information on the reconstruction since the war of this great Mediterranean port, as well as details on its layout, equipment and traffic. Copies are available from M. Bissuel, 56 rue Moliere, Lyon, France, for 1,200 fr., including statistical supplements on tariffs and traffic, and for 900 fr. without these supplements.

• **Behavior of residential buildings** and building materials during the disastrous 1950 flood in Winnipeg, Man., is summarized in Technical Report No. 9 of the Canadian National Research Council, Division of Building Research. The 44-page bulletin, "Damage to Houses—Red River Valley Flood, 1950," by D. H. Rutherford and A. Baracos, describing observations on 10,000 houses. Write: Publications Section, Div. of Building Research, Ottawa, Ont. Price 50¢.

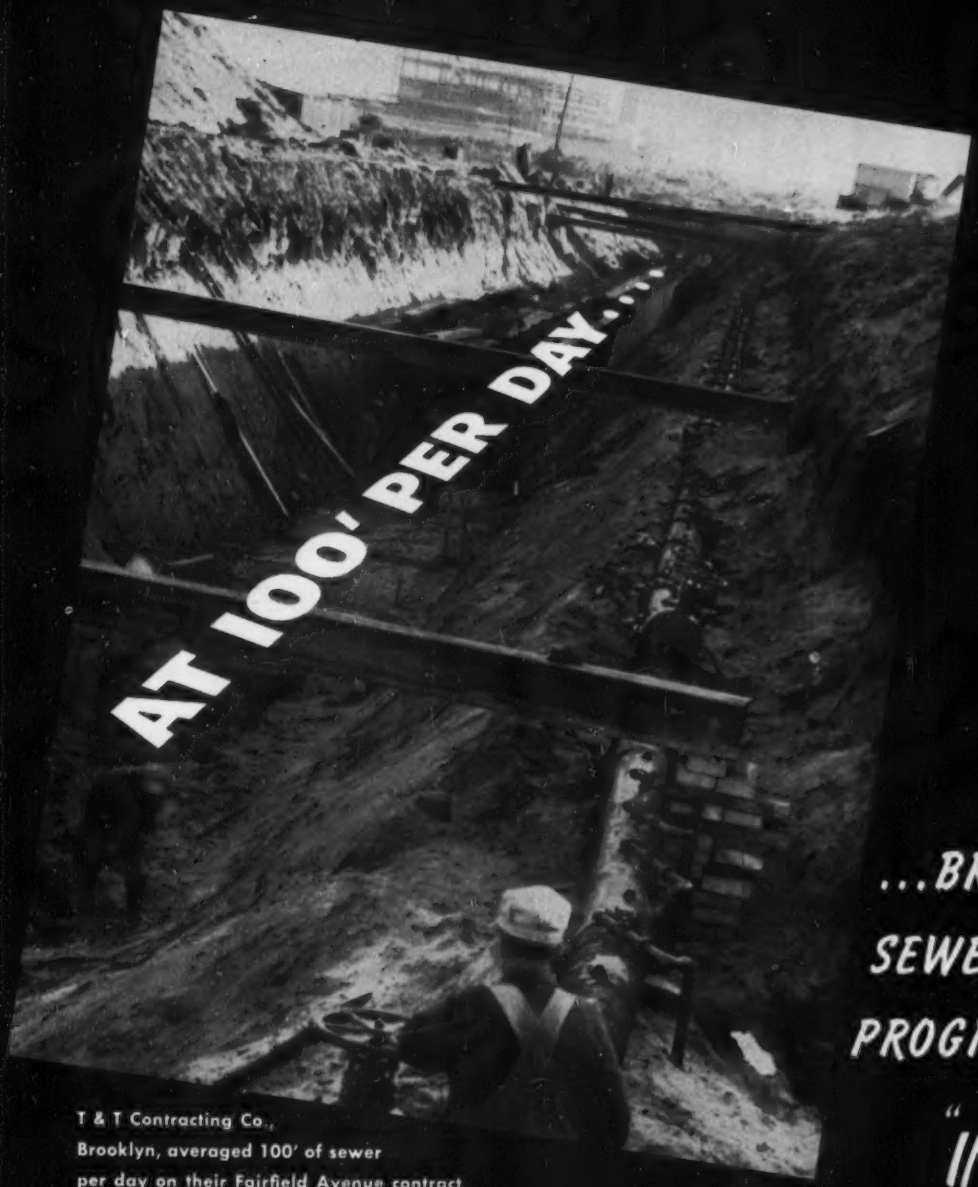
New engineering books

HISTORIC AMERICAN HIGHWAYS—Vol. II of Public Roads of the Past—By Albert C. Rose. 183 pp. American Association of State Highway Officials, 917 National Press Bldg., Washington 4, D. C. $4.

BUILDING CONSTRUCTION COST DATA: 1954—By Robert Snow Means. 60 pp. For sale by the author, P.O. Box 36, Duxbury, Mass.

CANADIAN CONFERENCE ON PRESTRESSED

(Continued on page 102)



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BOOKS

CONCRETE: Jan. 28-29, 1954. Available from the Director, University Extension, University of Toronto, Simco Hall, Toronto 5, Ont. $2.50 (Canadian funds).

Reports and pamphlets

RECORDS AND REPORTS OF LOCAL HEALTH DEPARTMENTS—Criteria and Methods for Organization, Maintenance and Use, Public Health Monograph No. 15, U. S. Department of Health, Education and Welfare, Superintendent of Documents, Washington 25, D. C. 45¢.

PRESTRESS INDUCED IN CONSOLIDATED QUICK TRIAXIAL TESTS—Harvard Soil Mechanics Series No. 42, Harvard University, Pierce Hall, Cambridge, Mass.

EFFECTS OF STRESS HISTORY ON THE STRENGTH OF CLAYS—Harvard Soil Mechanics Series No. 43, Harvard University, Pierce Hall, Cambridge, Mass.

RECLAMATION OF MUNICIPAL REFUSE BY COMPOSTING—Technical Bulletin No. 9, Sanitary Engineering Research Project, University of California, Berkeley. Price $1.00.

STRUCTURAL PROPERTIES OF LIGHT-GAGE TUBULAR COLUMNS—Housing Research Paper 21, Division of Housing Research. Superintendent of Documents, Washington 25, D. C. 25¢.

HYDRAULICS OF CLOSED CONDUIT SPILLWAYS: PART I. THEORY AND ITS APPLICATION—Technical Paper No. 12, Series B, St. Anthony Falls Hydraulic Laboratory, Minneapolis 14, Minn.

PROCEEDINGS OF THE WESTERN CONFERENCE ON PRESTRESSED CONCRETE—Los Angeles: November, 1952. University of California, Department of Engineering, Los Angeles 24, Calif. $5.00.

PROCEEDINGS OF THE FIFTH CALIFORNIA STREET AND HIGHWAY CONFERENCE—February 4-6, 1953. The Institute of Transportation and Traffic Engineering, University of California, Berkeley. $2.00.

ENGINEERING: A CREATIVE PROFESSION—Engineers Council for Professional Development, 33 West 39th St., New York 18, N. Y. 25¢—less in quantities.

PROCEEDINGS OF THE SECOND SOUTHERN MUNICIPAL AND INDUSTRIAL WASTE CONFERENCE—Held at Department of Sanitary Engineering, University of North Carolina, Chapel Hill, March 19-20, 1953.

THE EFFECT OF SUSTAINED OVERLOAD ON THE STRENGTH AND PLASTIC FLOW OF REINFORCED CONCRETE BEAMS—Reprint from the Journal of the American Concrete Institute, September, 1953. Committee on Reinforced Concrete Research, American Iron and Steel Institute, 350 Fifth Ave., New York 1.

Sand drains up to 97 feet deep were part of the problem on a big bridge project in an eastern state.

A MARION 93-M with a 100-foot special crane boom handled this unusual job.

Weight of the leads, hammer, mandrel and skip loaded with sand exceeded 70,000 pounds — handled at a 22-foot radius with the boom at an 80-degree angle.

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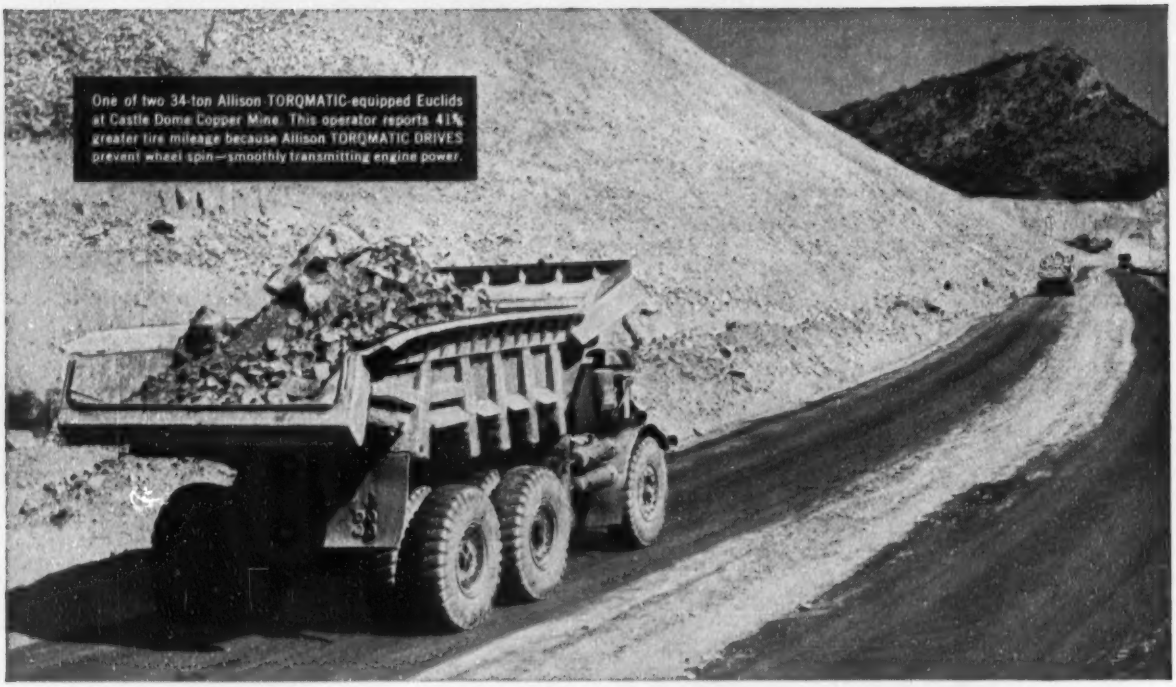

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OBITUARIES

William G. Peaslee, 92, identified with the early steel industry and the American Bridge Co. for 50 years, died at Canton, Ohio, Feb. 18. For many years he supervised erection of bridges in Ohio and nearby states.

B. G. Dahlberg, 73, former president and retired chairman of the board of The Celotex Corp., died at Miami Beach, Fla., Feb. 20. He established the corporation in 1921 to develop a process of making structural insulating board from bagasse, the fibrous residue from sugar cane.

Francis J. Kirchhof, 60, president of the F. J. Kirchhof Construction Co., Denver, died there Feb. 21. His father founded the firm in 1888. Its many construction projects in the Rocky Mountains include the Denver Mint, Colorado National Bank, University of Denver stadium, St. Joseph's and St. Luke's Hospitals in Denver, Fitzsimons Army Hospital at Aurora, Colo., and many buildings at Lowry Air Base in Denver.

Albert W. Gray, 79, former construction superintendent of the Stone & Webster Engineering Corp., and long identified with hydroelectric developments in the Far West and eastern industrial executive work, and for 16 years chairman of the Hartford Electric Steel Corp., died at Hartford, Conn., March 1.

Hal Young Miller, 53, of Wilmington, N. C., road inspector for the North Carolina Highway Department, died March 2. He received his engineering degree from North Carolina State College.

Charles M. Lightburn, 69, a cofounder of the Colorado Society of Engineers, died Feb. 28 in Denver. The coroner's office listed his death as a suicide. Lightburn attended Colorado University and began work for the Denver & Rio Grande Western railroad in 1912 as a draftsman, later becoming a valuation engineer. He retired from the railroad early in February. He served on the Denver City Planning Commission from 1930 to 1942, one term as president. He was also a member of the Colorado State Planning Board.

George F. Brockman, 60, a former civil engineer for the Metropolitan Sewer District of Louisville, Ky., died there Feb. 18. He had been with the Army Corps of Engineers.

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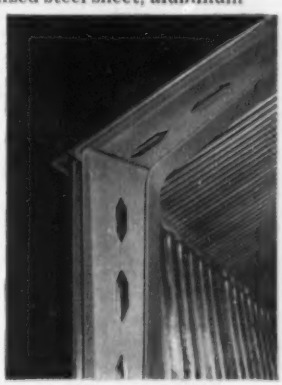

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

Conn., Norwalk—B.A. 3/23—City, Wm. J. Creagh, clk., City Hall, Contracts 1 and 2, refuse incinerator plant alterations, rehabilitation. Plans deposit $25. Bowe & Albertson & Assocs., 110 William St., New York, N. Y., engrs.

Mass., Boston—B.A. 3/25—Commonwealth of Mass., Metropolitan Dist. Comn., 20 Somerset St., Boston, Contr. No. 212, furnishing, del. c.i. pipe and fittings, gate valves, check valves, reducing valves, air valves, bronze pipe and fittings, crane add hoists, pumps and air blower in city of Somerville. Plans deposit $5, refundable. Frederick W. Gow, Construction Div., ch. engr.

BIDS ASKED—BUILDINGS

Conn., Middlefield—SCHOOL—B.A. 3/22—Town, Town School Dist., Dr. Harry C. Knight, chn. 1 story, brick, steel, concrete, elementary school Hubbard St. Plans deposit $75. Carl E. Segerberg, 363 Main St., archt. CD 1/5.

Conn., Hartford—PARKING GARAGE—B.A. 3/26—City, c/o N. B. Henson, purch. agt., 550 Main St., municipal parking garage, sewer lines, ramps, etc. bounded by Ann, Church, Chapel and Trumbull Sts. Plans deposit $100. CD 11/30/50.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., Concord,

Frank Whitcomb Constr. Corp., North Walpole, N. H., LB $188,585, asph. and peastone resurf. 73 mi. Grafton, Sullivan, Cheshire, Hillsboro and Merrimack Counties, CD 2/19;

S. V. Rossi Constr. Co., 49 McDermott Ave., Torrington, Conn., LB $419,026, road mix 2¾ mi. Rtes. 25 and 3A, Plymouth. Bids Mar. 4. CD 2/24.

▲ **MAINE**—Maine Turnpike Auth., 17 Bishop St., Portland,

The Savin Constr. Corp., 10 Village St., East Hartford, Conn. LB $1,745,506. Contr. 204;

Lane Constr. Corp., 37 Colony St., Meriden, Conn. LB $633,829. Contr. 204A.

H. E. Sargent, Inc., Stillwater, Me. LB $1,463,977. Contr. 204B, Section 2 grading, drainage Augusta Extension, Falmouth, Gray and Cumberland. Bids Mar. 4. CD 2/18.

Peter Kiewit Sons Co., Grays Ave. and 59 St., Phila., Pa. LB $790,863, Bid No. 620, sewer constr., Moshassuck Valley Interceptor, Sect. A, Pawtucket, PROVIDENCE, R. I. State of R. I. and Providence Plants, F. A. Adams, purch. agent, State House, Providence, R. I. Bids Mar. 3. CD 2/24.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Sanders Constr. Corp.**, 415 Congress St., Portland, Me. CA Est. $19,000,000. STEAM POWER PLANT, Birch Point-Cousins Island, YARMOUTH, ME. Central Maine Power Co., 9 Green St., Augusta, Me. CD 1/25.

▲ **Poorvu Constr. Co., Inc.**, 294 Washington St., Boston, Mass. CA $1,659,668, high SCHOOL, Billerica, MASS. Town, Town Hall, Billerica, Mass. CD 2/15, under LB.

▲ **Jefferson Constr. Co.**, 75 First St., Cambridge, Mass. LB $1,637,000. South Junior High SCHOOL Warren and Clifton Aves., BROCKTON, MASS. City, Brockton, Mass. Bids Mar. 3. CD 1/19.

Jefferson Constr. Co., 75 First St., Cambridge, Mass. LB $531,000. Alt. A add. $10,000. Elementary SCHOOL addn., South River St., MARSHFIELD, MASS. Town, Elementary School Bldg. Comn., Marshfield, Mass. Bids Feb. 25. CD 1/29.

P. Francini & Co., Inc., Francis St., Derby, Conn., CA $817,528, two elementary SCHOOLS, Gerrish Ave. and Foxon Rd., EAST HAVEN, CONN. Town Bldg. Comn., Town Hall, East Haven, Conn. Bids Dec. 29, awarded Mar. 2. CD 1/5, under LB.

▲ **E & F Constr. Co.**, 94 Wells St., Bridgeport, Conn., LB, $1,289,000, three elementary SCHOOLS, Meadow Side Rd., Orange Ave. and Bryan Hill Area, MILFORD, CONN. Town Bd. Educ., Town Hall, Milford, Conn. Bids March 3. CD 2/9.

R. F. Jones Co., Inc., 150 Willard St., Newington, Conn., CA, $613,967, Northwest Elementary SCHOOL, NEWINGTON, CONN. Bd. Selectmen, Newington, Conn. Bids Feb. 19, awarded Mar. 4. CD 3/2, under LB.

Giordano Constr. Co., 287 Main St., Branford, Conn., LB, $581,000, Proj. MR-51 HOUSING, SHELTON, CONN. City Housing Auth., Municipal Bldg., 40 White St., Shelton, Conn. Bids Mar. 2. CD 2/12.

Hayes Constr. Co., 1285 East St., New Britain, Conn., CA, $638,396, Elementary SCHOOL, South End-Springlake Schools, SOUTHINGTON, CONN. Town School Bldg. Comn., Town Hall, Southington, Conn. Bids Feb. 4, awarded Feb. 26. CD 2/10, under LB.

MIDDLE ATLANTIC

BIDS ASKED—BUILDINGS

N. Y., Briarcliff Manor—SCHOOL—B.A. 3/25—Bd. Educ., Union Free School Dist. 2, Towns of Ossining and Mt. Pleasant, at office in High School, Briarcliff Manor, general constr., electrical work, plumbing work, heating and ventilating work for addns. to The Todd School, near Pleasantville Rd. Plans deposit $10. Edward F. O'Dwyer, 58 E. State St., Westport, Conn., archt.; adv. ENR 3/18/54. CD 3/19/52.

N. J., Trenton—SALES, SERVICE—B.A. About 4/1—Bonderchuk Chevrolet Inc., 1285 S. Broad St., auto sales and service bldg. $150,000. Micklewright & Mountford, 72 Ewing St., archts. CD 7/11/52.

▲† **Md., Fort George G. Meade**—MAIN BUILDING—Bids in May—U. S. Eng., P.O. Box 1715, Baltimore, 3 story, bsmnt., 1,400,000 sq. ft. main bldg. with 600,000 sq. ft. warehouse, roads, access area, etc. for National Security Administration. $25,000,000. Reisner & Urbahn, 654 Madison Ave., New York, N. Y., archts. Anderson-Nichols & Co., 330 W. 42 St., New York 36, N. Y., engrs. CD 5/16/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Mel Constr. Corp., 1407 Bassett Ave., Bronx 66, N. Y. LB $177,159, playground adjacent to P.S. 35, Martha St. to Foote Ave. west of Serpentine Rd., Richmond Boro, Contr. No. R-69-153B, NEW YORK. Comr. Parks, at office Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York 1, N. Y. Bid Feb. 17. (Correction—contractors name). CD 2/23, under LB.

Town, Hector, N. Y. Own Forces. $65,800, Imprv. roads 1954 schedule, HECTOR, N. Y. CD 10/31/51.

Merritt-Chapman & Scott Corp., 260 Madison Ave., New York 16, N. Y., CA $997,393, est. $1,300,000, marginal wharf and bulkhead shed to replace Piers 78 and 79, Contr. LT 160.032, NEW YORK, N. Y. Port of New York Auth., 111 8th Ave., New York 11, N. Y. Bids Jan. 12. CD 12/31.

Town, Sangerfield, N. Y., Own Forces. $143,710, 20.53 mi. roads, SANGERFIELD, N. Y. CD 10/4/51.

Town, Unadilla, N. Y. Own Forces. $70,000, 10 mi. roads, UNADILLA, N. Y.

† **Del Patria Constr. Co.**, 34 W. Mississippi Ave., Atlantic City, N. J., LB, $142,870, drainage system exten. and soil erosion control, Naval Air Station, NOY 82539, Spec. 42585, ATLANTIC CITY, N. J. Dpt. Navy, Phila. Naval Base, Phila., Pa. CD 2/18.

Van Lieu & Van Horn, Flemington, N. J., LB, $286,662 sewage pumping station and treatment plant, GIBBSTOWN, N. J. Greenwich Twp. Comn., Gibbstown, N. J. Bids Feb. 15. CD 2/3.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg,

A. B. Cole, Meshoppen, Pa., LB $463,226, constr. 32,429 ft. crushed aggregate base with bit. surf. variable in width, two I-beam bridges, T. R. 292, Easton, Monroe and Westmoreland Twps., Wyoming Co.;

Burrell Constr. & Supply Co., 1 Fifth Ave., New Kensington, Pa., LB $79,981, wid'n. and overlay 8,536 ft. existing road with crushed aggregate base and bit. surf. 20 ft. wide, App. 417 (R-1), Saxonburg Boro, Clinton Twp., Butler Co.;

Collins & Maxwell, Inc., Easton, Pa., LB $193,641, constr. 11,118 ft. crushed aggregate base with bit. surf. variable in width, T.R. 22-512, Bethlehem, Northampton Co.;

County Constr. Co., 25 E. Main St., Carnegie, Pa., LB $329,969, constr. 21,690 ft. hy. crushed aggregate base with bit. surf., 18 ft. wide, L.R. 25016 (2-R), Girard and Fairview Twps., Erie Co.;

Edward A. Daylor Co., P.O. Box 551, Coatesville, Pa., LB $80,459, constr. 2,537 ft. crushed stone base with bit. surf. variable in width, an I-beam bridge, L.R. 46009 (1), Douglass Twp., Montgomery Co.;

Frank Mark Co., Caston Ave. and Winghocking St., Phila. 24, Pa., LB $72,731. constr. 2,060 ft. hy. of crushed aggregate base with bit. surf. variable in width, L.R. 67045 (6), Vine St., Philadelphia Co.;

Marsolino Constr. Co., 302 Fayette Natl. Bank Bldg., Uniontown, Pa., LB $379,996, constr. 14,327 ft. crushed aggregate roadway with bit. surf. 24 ft. wide, L.R. 26062 (3), German S. Union and Menallen Twps., Fayette Co.; LB $92,642, constr. 1,995 ft. crushed aggregate base with bit. surf. 18 ft. wide, one I-beam bridge, L.R. 26032. Menallen and Franklin Twps., Fayette Co.;

Mount Joy Constr. Co., P.O. Box 185, Mount Joy, Pa., LB $596,141. wid'n. and overlay 10,261 ft. road with crushed aggregate base and bit. surf. variable in width, one through plate girder bridge, T.R. 29, West Penn Twp., Schuylkill Co.;

D. E. Smith, Inc., Mifflintown, Pa., LB $274,313. wid'n. 64,236 ft. existing road with crushed aggregate base and bit. surf. 5 ft. 4 in. wide, T.R. 322, Harris and Potter Twps., Centre Co.;

Louis S. Westcott, 118 Oak Glen Rd., Pittsburgh, Pa., LB $82,232. constr. 2,310 ft. crushed aggregate base with bit. surf. 16 ft. wide, L.R. 25068 (1-R), Harbor Creek Twp., Erie Co. Bids Mar. 5. CD 2/3.

R. M. Luff Constr. Co., Willow Grove, Pa., LB $790,101, est. $812,601, sewage disposal plant extens., BON AIR, PA. Haverford, Radnor and Marple Twp. Comns., Township Bldg., Havertown, Pa. Bids Feb. 1. CD 12/15.

Globe Contg. Co., Victory Ave. and Cobbs Creek, Upper Darby, Pa., LB $391,955. Bid No. 2121, sewers; LB $172,871, Bid No. 2122, sewers;

Leva Bros., 5416 Rising Sun Ave., Phila., Pa., LB $125,716, Bid No. 2123, sewers;

Miniscalco Bros., 4053 K St., Phila., Pa., LB $[illegible],035, Bid No. 2124, sewers;

Dominic Vallone, 2125 S. Woodstock St., Phila., Pa., LB $81,837, Bid No. 2125 and 2126, sewers, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Samuel S. Baxter, c/o owner, water comr. CD 3/11/48.

Leon Levinson, 3433 Ridge Ave., Phila., Pa., LB $61,270, est. $78,608, recreation center, (playground), 8th and Brown Sts., Oscar G. Stonorov, 1621 Chestnut St., Phila., Pa., archt.;

P. Agnes, 2213 S. Broad St., Phila., Pa., LB $80,000, est. $152,220, general contract Smith Recreation Center, playground, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Montgomery & Bishop, 138 N. 17 St., Phila., Pa., archts. CD 2/8/45.

† **American Dredging Co.**, 12 S. 12 St., Phila., Pa. LB $37,950, maintenance dredging, Reserve Basins, Naval Base, NOY 82543, Spec. 42589, PHILA., PA. Dpt. Navy, Phila., Naval Base, Phila., Pa.

Conduit & Foundation Corp., 158 N. 20 St., Phila., Pa. CA $961,798. Mill Creek Relief Sewerage Sys., 47th St. and Fairmount Ave., PHILA., PA. Procurement, City Hall Annex, Phila., Pa. Bids Dec. 3. CD 12/15, under LB.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

Water Supply	**Latin America**
Sewers, Waste Disposal	**Public Buildings**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	**Federal Government**
▲	**Project of $1,000,000 or over.**
B.A.	**Bids Asked**
ENR	**Engineering News-Record**
CD	**Engineering News-Record Construction Daily**

Don't Let the Wrong BUCKET PICK YOUR POCKETS

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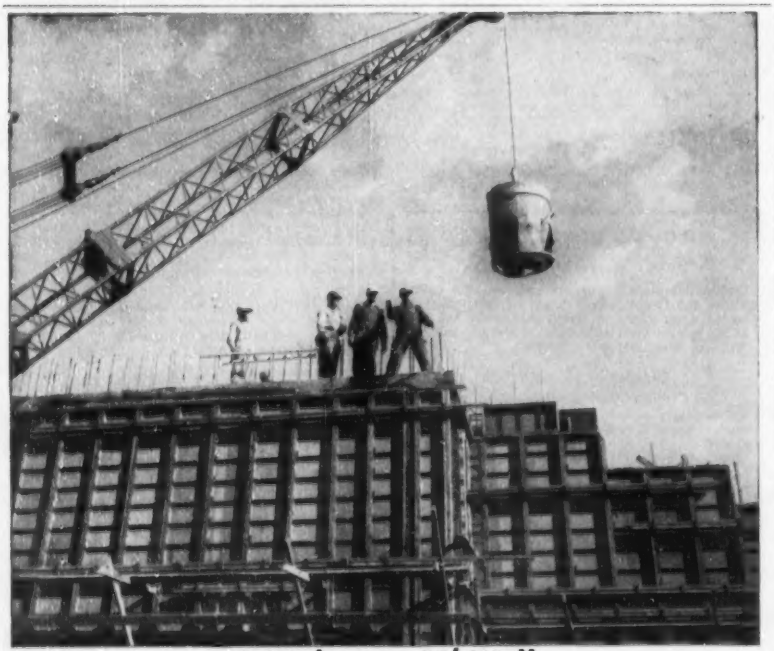

3 Walers on 16' Wall

Henry Carlson Const. Co., Sioux Falls, S. D., used only 3 walers with Symons Forms on 16' high 12" thick wall for City Water Treatment Plant. 10,000 square feet of Symons Panels were reused 12 times on the job, resulting in savings of labor, material and fast forming.

To pour these high walls certain upper panels were raised 1 foot to permit pouring through side openings for the first 8 feet of concrete.

Send the plans for your next job and get complete layout and cost sheets—no obligation. Catalog F-9 available on request. Symons Clamp & Mfg. Co., 4265-C-4 Diversey Ave., Chicago 39, Illinois.

(Advertisement)

Housing Eng. Co., 1229 W. Mount Royal Ave., Baltimore, Md. CA $500,000. alteration to grandstand Pimlico Race Track, BALTIMORE, MD. Maryland Jockey Club, 5201 Park Heights Ave., Baltimore, Md. Arnold W. Cigahn, 1279 Summit Ave., Lakewood, O. CD 12/15.

Pleasanton & Edgell, Inc., Dover, Del., LB, $90,000. Capitol Trail Lateral Sewers, NEWARK, DEL. City Council, City Hall, Newark, Del. Bids Feb. 16. CD 1/28.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Gull Manor Homes, c/o A. N. Sirof, engr., 624 Madison Ave., New York 22, N. Y. Owner Builds. $1,500,000. HOUSING and SHOPPING CENTER, 300-acre tract, Rte. 6, CORTLANDT, N. Y.

Douglaston Woods Homes, c/o A. H. Salkowitz, archt., 37-60 82 St., Jackson Heights, N. Y. Owner Builds. $900,000. 48 HOUSES, 247 St., 248 St., Zion St., Deepdale Ave., south of Northern Blvd., DOUGLASTON, N. Y.

▲ Heathermont Hills Homes, c/o Laurence Moon, archt., 36 Grand Ave., Englewood, N. J., Owner Builds. $1,000,000. 34 HOUSES on tract in Ramapo Sect., SUFFERN, N. Y.

▲ Hadley Contrg. & Constr. Co., 1213 Wood St., Phila., Pa., CA, $1,103,041, ADMINISTRATION and SENILE BLDGS. etc. N. J. State Hospital, ANCORA, N. J. N. J. Div. Purchase & Property, State House, Trenton, N. J. Bids Jan. 12. CD 1/20, under LB.

Blackwood Gardens, Inc., 322 E. Church St., Blackwood, N. J. Separate Contracts, $800,000, RESIDENTIAL DEVELOPMENT, Penna. Ave., BLACKWOOD, N. J. Robertson & Jacobson, 10 St., Camden, N. J., engrs.

Frank Belluscio & Sons, 451 Morris Ave., Elizabeth, N. J. LB, $117,438, general contract LAUNDRY, Bordentown Reformatory, BORDENTOWN, N. J. State Dpt. Purchase & Property, State House, Trenton, N. J. Bids Feb. 18. CD 2/4.

▲ F. A. Collins, Belmont Ave. and City Line, Phila., Pa., Separate Contracts, $15,000,000, RESIDENTIAL DEVELOPMENT, Cherry Hill Section, ELLISBURG, N. J. George Hay, Lima, Pa., archt.

Broadway Gardens Homes, c/o Nathan Gurtman, archt., 140 Market St., Paterson, N. J. Owner Builds, $800,000. 45 HOUSES on tract off Fairlawn Parkway south of Route 4, FAIRLAWN, N. J.

Irwin & Leighton, 1505 Race St., Phila., Pa., CA, $180,000. TELEPHONE SERVICE BLDG., paving, sanitary and storm drainage sys., HAMMONTON, N. J. New Jersey Bell Telephone Co., 540 Broad St., Newark, N. J. Bids Jan. 26. CD 1/20.

William B. Keufer, R. D., Moorestown, N. J., Separate Contracts, $600,000, RESIDENTIAL DEVELOPMENT, Pleasant Valley Ave., MOORESTOWN, N. J. William Duble, Erlton, N. J., archt.

▲ Meadowbrook Corp., 7269 Cedar Ave., Pennsauken, N. J. Separate Contracts, $1,509,000, RESIDENTIAL DEVELOPMENT, Union Ave., PENNSAUKEN, N. J. Edward A. L. Cox & Martin Guttman, 709 Market St., Camden, archts.

Jim Whitesell, 702 Cedar Lane, Riverton, N. J. Separate Contracts, $90,000. 1 story masonry WAREHOUSE, RIVERTON, N. J.

Owner, c/o Edward A. L. Cox & Martin Guttman, assoc. archts., 709 Market St., Camden, N. J. Separate Contracts, $500,000. 50 unit RESIDENTIAL DEVELOPMENT, 63 to 67 Sts., SEA ISLE, N. J.

▲ Thomas Constr. Co., Somerdale, N. J., Separate Contracts, $1,500,000. RESIDENTIAL DEVELOPMENT, Somerdale Rd. and E. Atlantic Ave., SOMERDALE, N. J.

Interstate Constr. Corp., 91 Main St., Flemington, N. J. Separate Contracts, $500,000. RESIDENTIAL DEVELOPMENT, Hamilton Twp., Quaker Bridge and Youngs Rds., TRENTON, N. J.

Carl Metz Corp., 1614 E. Upsal St., Phila., Pa. Separate Contracts. $310,000. RESIDENTIAL DEVELOPMENT, Beverly Rd., etc. ABINGTON, PA. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

Becker & Lipschitz, 4441 N. Broad St., Phila., Pa. Separate Contracts. $952,000. 68 RESIDENCES, Butler Pike, AMBLER, PA.

Louis J. Rosato, 201 W. Broadway Ave., Clifton Heights, Pa., Separate Contracts. $305,000. RESIDENTIAL DEVELOPMENT, near Sproul Rd., BROOMALL, P. A.

▲ Ritter Bros., 1511 N. Cameron St., Harrisburg, Pa., LB $1,332,693, general constr. Senior HIGH SCHOOL in Colonial Park at Houck's Rd. and Locust Lane for Dauphin County Joint School Bd., COLONIAL PARK (P. O. Harrisburg), PA. Central Dauphin School Dist. Auth., Byron Catherman, secy., Penbrook School Building, Harrisburg, Pa. Bids Mar. 4. CD 2/9.

▲ Construction Service Co., 2409 N. Broad St., Phila., Pa., Separate Contracts. $6,000,000. 500 RESIDENCES, Route No. 1, FALLSINGTON, PA.

▲ Edwin E. Hollenback, 5624 Vine St., Phila., Pa., LB $1,299,746. Wm. Penn Junior HIGH SCHOOL, Fairless Hills, FALLSINGTON, PA. Falls Twp. School Auth., Falisington Pa. Pennell & Wiltberger, 1201 Chestnut St., Phila., Pa., engr. Bids Feb. 25. CD 1/21.

▲ Barness Constr. Co., Warrington, Pa., Separate Contracts. $1,500,000. RESIDENTIAL DEVELOPMENT, Byberry Rd., HATBORO, PA.

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R. M. Shoemaker Co., 1619 Sansom St., Phila., Pa., CA $150,000. PAINT BLDG. exten. MARCUS HOOK, PA. Sinclair Refining Co., Marcus Hook, Pa. C. Weber, c/o owner, ch. engr. at Marcus Hook, Pa. CD 1/20.

Charles Butera, 1212 W. Lafayette St., Norristown, Pa. CA $120,000. 1 story, 20,000 sq. ft., masonry, steel, WAREHOUSE, East Norriton Twp., NORRISTOWN, PA. Logan Store, Inc., 400 DeKalb St., Norristown, Pa. Herbert C. Anderson, 400 DeKalb St., Norristown, Pa., archt.

Crown Constr. Co., c/o owner, CA $305,000. RESIDENTIAL DEVELOPMENT, Belfield Ave. and Johnson St., PHILA., PA. Lowenthal & Co., 5603 Spruce St., Phila., Pa. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

Glenorr Constr. Co., 6032 Market St., Phila., Pa. Separate Contracts. $360,000. RESIDENTIAL DEVELOPMENT, Knorr and Charles Sts., PHILA., PA.

Hannigan Homes, 1447 W. Cayuga St., Phila., Pa. Separate Contracts. $300,000. RESIDENTIAL DEVELOPMENT, Red Lion and Verree Rds., PHILA., PA.

Lardner Homes, Inc., 1901 Devereaux Ave., Phila., Pa. Separate Contracts. $310,000. RESIDENTIAL DEVELOPMENT, Bustleton Ave. and Benner St., PHILA., PA. Christian H. Fries, 3701 N. Broad St., Phila., Pa., archt.

Himelfarb & Sons, 5424 Euclid St., Phila., Pa. Separate Contracts. $540,000. 52 RESIDENCES, Princeton, Algon and Summirdale Sts., PHILA., PA. I. W. Levin, 1531 Belmont Ave., Phila., Pa., archt.

▲† **Dpt. Navy**, Phila. Naval Base, Phila., Pa., rejected bids Jan. 22, NAVAL BOILER and TURBINE LABORATORY Bldg No. 633 addn., Naval Base, NOY 74547, Spec. 35504., PHILA., PA. LB $3,710,000. CD 2/3, under LB.

Samuel Gerson, 3018 W. Berks St., Phila., Pa. Separate Contracts. $300,000. RESIDENTIAL DEVELOPMENT, Levick and Sackett Sts., PHILA., PA. James G. Durham, 34 S. 17 St., Phila., Pa., archt.

Cross Bros., 3600 N. Front St., Phila., Pa. Separate Contracts. $500,000. meat packing PLANT and railroad siding, PHILA., PA. Godwin F. Werlin, c/o owner, ch. engr.

Joseph S. Mozino & Co., Inc., 423 Burmont Rd., Drexel Hill, Pa. Separate CONTRACTS. $450,000. 28 single HOMES, Sproul Rd., PHILA., PA.

Pepsi-Cola Metropolitan Bottling Co., Inc., 3929 G St., Phila., Pa. Separate Contracts. $300,000. 1 story, brick, WAREHOUSE, OFFICE, PHILA., PA. John V. Kohlhaas, Welsh Rd. west of Veree Rd., Phila., Pa., engr.

Easttown Co., 182 Bridge St., Phoenixville, Pa. Separate Contracts. $800,000. RESIDENTIAL DEVELOPMENT, Nutt Rd. and Starr St., PHOENIXVILLE, PA. Walter K. Durham, 1606 Latimer St., Phila., Pa., archt.

▲ **Wrenwood, Inc.**, c/o Ralph Caldwell, archt., Richboro, Pa. Separate Contracts. $1,100,000. RESIDENTIAL DEVELOPMENT, Wrightstown Twp., RICHBORO, PA.

Joseph S. Mozino & Co., Inc., 423 Burmont Rd., Drexel Hill, Pa. Separate Contracts. $375,000. 21 single HOMES, Conestoga Rd., ROSEMONT, PA.

Hillside Development & Constr. Co., Inc., 7936 Bustleton Ave., Phila., Pa., Separate Contracts. $500,000. RESIDENTIAL DEVELOPMENT, Green Lane, Valley and Hillside Drives; $305,000, RESIDENTIAL DEVELOPMENT, Manor Lane, SOUTHAMPTON, PA.

▲ **John J. McIlhinney**, 4507 N. Broad St., Phila., Pa. Separate Contracts. $1,250,000. 88 single HOMES, New Rd., SOUTHAMPTON, PA.

▲ **Springdell Corp.**, 7060 Garrett Rd., Upper Darby, Pa. Separate Contracts. $2,000,000. 120 RESIDENCES, State and Sproul Rds., SPRINGFIELD, PA. David Slott, 7060 Garrett Rd., Upper Darby, Pa., archt.

Richard G. Kelly, 212 Magnolia Ave., Kirklyn, Pa., Separate Contracts. $650,000. RESIDENTIAL DEVELOPMENT, Sycamore Rd., UPPER DARBY, PA. Erling Wenge, McClatchy Bldg., Upper Darby, Pa., archt.

Revely Village Corp., c/o Agent Benjamin Friedman, Yeadon, Pa. Separate Contracts. $500,000. RESIDENTIAL DEVELOPMENT, Longacre Blvd., YEADON, PA.

Nason & Cullen, Inc., 6522 Vine St., Phila., Pa., CA $307,290, CHURCH, YEADON, PA. St. Louis R. C. Church, 841 W. Cobbs Creek Parkway, Yeadon, Pa. Bids Feb. 11. CD 2/3.

Consolidated Eng. Co., 20 E. Franklin St., Baltimore, Md. CA $600,000. concrete, steel, masonry meat packing PLANT, addns., alterations, BALTIMORE, MD. Schluderberg-Kurdle Co., 3800 E. Baltimore St., Baltimore, Md. Henschien, Everds & Crombie, 59 E. Van Buren St., Chicago, Ill., archts.

▲ **Towson Park Constr. Co.**, Towson, Md. CA $2,086,000. 189 brick DWELLINGS Radcliffe Rd., Bosley Ave., Towson Court, Towson Park, TOWSON, MD. Radcliffe Homes, Inc. & Associates, Towson, Md.

▲ **Algernon Blair Co.**, First National Bank Bldg., Montgomery, Ala. CA Est. $5,000,000. Sect. 1, 508 semi-detached brick HOMES at Palmer Park, Kent District, Prince Georges Co., UPPER MARLBORO, MD. Frank Development Co., Inc., 1523 L St. N.W., Wash., D. C. Pearson, Title & Narrows, First National Bank Bldg., Montgomery, Ala., archts. Pierre Ghent & Assoc., 1836 Jefferson Pl. N.W., Wash., D.C., engrs. Fred W. Tuemmler & Assoc., Professional Bldg., Hyattsville, Md., city planners. Awarded Feb. 26.

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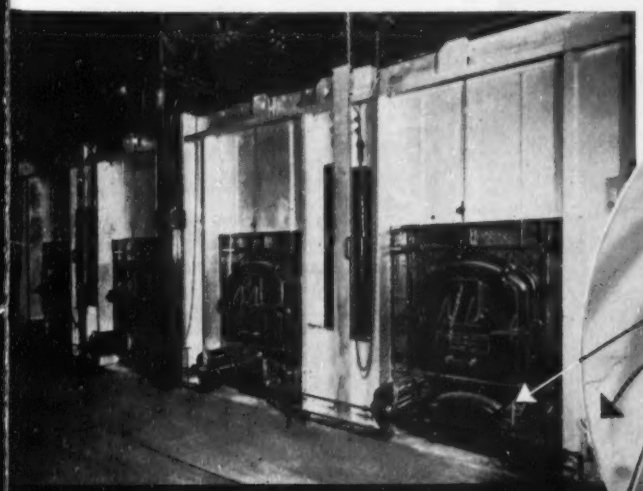

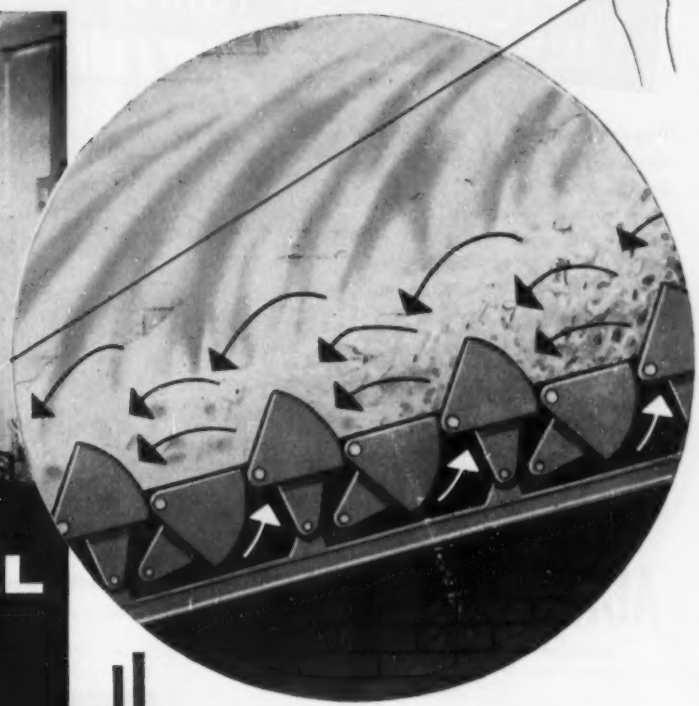

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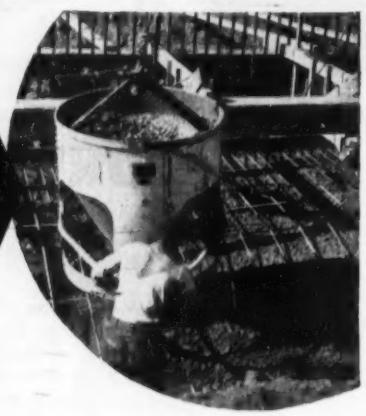

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W. P. Lipscomb Co., Inc., Woodward Bldg., Wash., D. C., CA, $510,000, MEDICAL BLDG., Military Rd., Western Ave. and Wisconsin Ave: N.W., WASH., D. C. Clinic Properties Assoc. Inc., Ring Bldg., Wash., D. C. Bids Dec. 30. CD 1/7, under LB.

Southern Commercial Constr. Co., 1301 Pennsylvania Ave. S.E., Wash., D. C., CA, $687,400, elementary SCHOOL E. Capitol St. and 55 St. S.E., WASH., D. C. Govt., Dir. of Bldgs. & Grounds, 499 Pennsylvania Ave. N.W., Wash., D. C. Bids Feb. 19, awarded Mar. 1. CD 2/24, under LB.

John E. Healy & Sons, Inc., 707 Tatnall St., Wilmington, Del., LB, $384,685, CHURCH and SCHOOL, BELLEFONTE, DEL. St. Helena's Roman Catholic Church, 610 Phila., Pike Bellefonte, Wilmington, Del. Bids Feb. 26. CD 2/18.

Talley & Hurst, 1704 Shallcross Ave., Wilmington, Del., CA, $200,000, 1 story, 176x241 ft., block, brick, concrete food WAREHOUSE, WILMINGTON, DEL. Hearne Brothers, Washington St. and Concord Ave., Wilmington, Del.

George Leonard Porter Jr., 400 First Ave., Lyndillia, Wilmington, Del., Separate Contracts, $972,000, RESIDENTIAL DEVELOPMENT, Redmont and Marshallton Sts., WILMINGTON, DEL.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† Va., Norfolk—PAVEMENT REPAIRS—B.A. 3/23—P. Wks. Office, Headquarters, Fifth Naval Dist., U. S. Naval Base, Zone 11, pavement repairs at U. S. Naval Air Station, NOY 82900; Spec. 42734. Plans deposit $10.

† Fla., Cocoa—DORMITORIES ALTERATIONS—B.A. On or About 4/8—U. S. Eng., P. O. Box 4970, Jacksonville, airmens' dormitories alterations, Air Force Missile Test Center, Patrick Air Force Base, Serial No. Eng-08-123-54-47.

BIDS ASKED—BUILDINGS

Ky., Louisville—COURT—B.A. 3/24—City, City Hall, fiscal court addn. $440,000. Walter Wagner & Joseph Potts, Fincastle Bldg., archts. E. R. Ronald & Assoc., 544 S. Third St., engrs. CD 2/3.

▲ Ky., Louisville—SCHOOL—B.A. 4/1—Bd. Educ., Fifth and Hill Sts., Lucie N. Duvalle Junior High School and Jas. S. Cotter Elementary School, $1,000,000. W. S. Arrasmith & Wm. Tyler, Madrid Bldg., archts. E. R. Ronald & Assoc., 544 S. Third St., engrs. CD 3/30.

SOON LETS CONTRACT—BUILDINGS

Ky., Louisville—LAUNDRY—Spalding Laundry Co., 835 S. 13 St., soon lets contract laundry addn. Jas. H. Kolbrook, Starks Bldg., archt. E. R. Ronald & Assoc., 554 S. Third St., engrs.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † Morrison-Knudsen Co., Inc., and Landers & Griffin, Inc., 122 E. 42nd St., New York, N. Y., LB $2,911,609, Schedules 1 and 2, roads, railroads and utilities, Air Force Base, ENG-19-016-54-59, PORTSMOUTH, VA. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Bids Feb. 26. CD 1/13.

† Clarendon Box Co., Manning, S. C., LB $91,443, crash and fire station, Shaw Air Force Base, No. 38-081-54-14, SUMTER, S. C. U. S. Eng., Custom House, Charleston, S. C. Bids Mar. 2. CD 2/5.

† Atlas Constr. Co., Box 56, Vidalia, La. LB $309,765. constr. approx. 3,800 cu. yd. excav. and Bouef River Channel imprv. consisting 4,100 cu. yd., West Carroll and Morehouse Parishes, La., Chicot Co., Ark., Inv. 54-81, LOUISIANA and ARKANSAS. U. S. Eng., P.O. Box 60, Vicksburg, Miss. Bids Feb. 16. CD 12/24.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Ornstein Constr. Co., 1025 Vermont Ave. N. W., Wash., D. C. Owner Builds. Approx. $1,500,000. 96 two story bsmnt. masonry RESIDENCES, near ALEXANDRIA, VA. CD 1/4.

▲ Larchmont Constr. Corp., 1073 W. Broad St., Falls Church, Va. Owner Builds. Approx. $1,000,000, eighty 1 and 2 story bsmt., masonry RESIDENCES, ANNANDALE, VA. CD 2/10.

† B. A. Bowles Co., 118½ E. Main St., Salem, Va., LB $369,833. WEATHER STATION, buildings, utilities, site imprvs. and other work, ENG-44-110-54-5, BEDFORD, VA. U. S. Eng., foot of Front St., Norfolk, Va. Hayes, Seay, Mattern & Mattern, 609 S. Jefferson St., Roanoke, Va., archts. Bids Mar. 2. CD 2/4.

English Constr. Co., Altavista, Va., CA $874,200. 1 and 2 story, masonry Brunswick County HIGH SCHOOL, LAWRENCEVILLE, VA. Brunswick County School Bd., Lawrenceville, Va. Bids Mar. 3. CD 2/10.

▲ Kanawha Mfg. Co., 1520 Dixie St., Charleston, W. Va., CA, $1,200,000, fabricating structural steel COAL STORAGE BINS, CONVEYORS and COAL PREPARATION PLANT, WARD, W. VA. Valley Camp Coal Co., Ward, W. Va. Robert Bradford, c/o owner, engr.

Laxton Constr. Co., Inc., 127 Brevard Ct., Charlotte, N. C. CA $580,564. CLASSROOM addn. at East Mecklenburg High School, PHYSICAL EDUC. BLDGS. at East, West and North Mecklenburg High Schools, CHARLOTTE, N. C. Mecklenburg Co. Bd. Educ., Court House, Charlotte, N. C. M. R. Marsh, Chatham Bldg., Charlotte, N. C., archt. Bids Feb. 25. CD 10/9/50.

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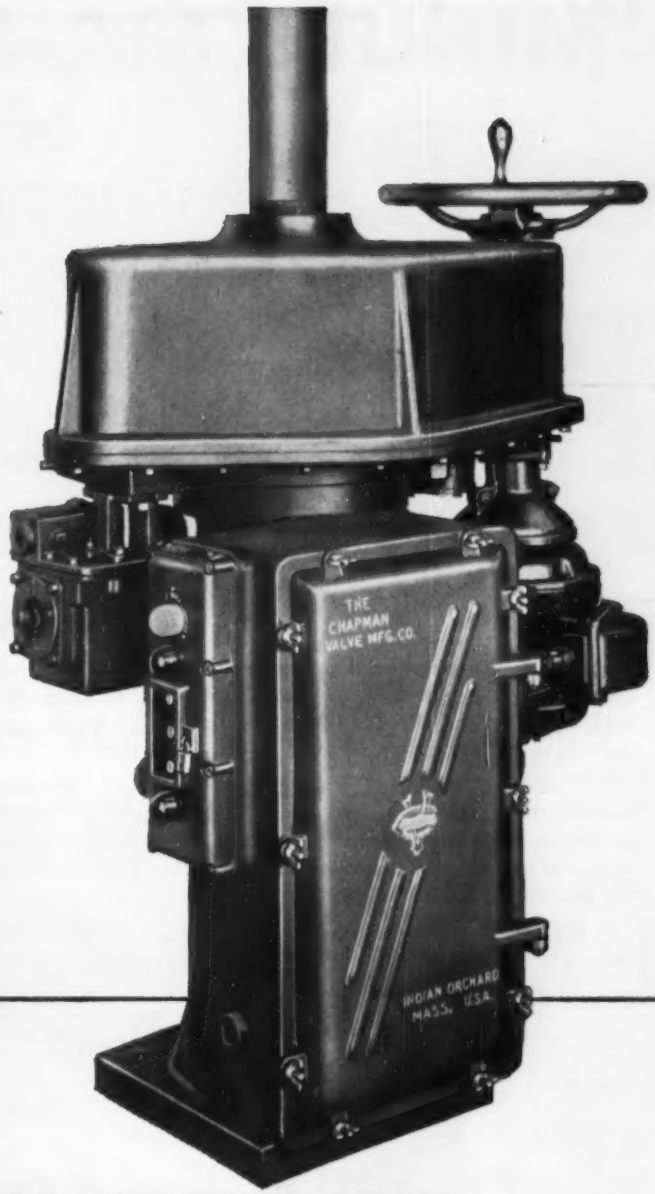

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Instant control of valves and large sluice gates at the touch of a button . . . that's what you get with Chapman Motor Units on the job. Completely housed and thoroughly dust and weather proof, these units are built "to take it" for years, on the roughest service. They're designed for simplicity and extreme ruggedness, as shown by internal view above.

Chapman Motor Operated Floorstands are delivered to the job with all internal wiring complete, so all the wiring to be done is to bring the power leads into the connection box... saving time and money in installation and assuring proper operation. Write for Catalog No. 50.

The Chapman Valve Manufacturing Co.
INDIAN ORCHARD, MASSACHUSETTS

MINUTE MAN of MOVING MIRACLES

MIRACLE is a strong word but when the operator of this trailer can detach the gooseneck—unload a ponderous shovel and reattach the gooseneck in as little as 5 minutes it is truly *miraculous*.

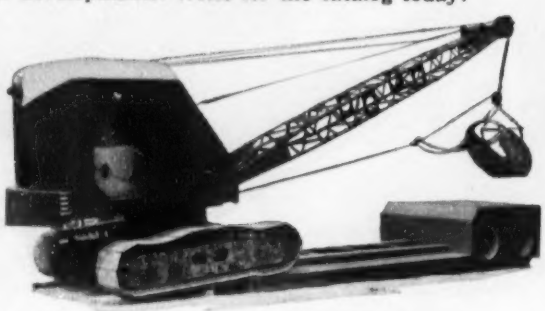
This is being done with the Rogers Power-Lift Detachable Gooseneck Trailers. Moreover, operators can quickly lower the gooseneck for the load to clear low overhead obstructions or raise it to pass over high banked railroads, etc., often avoiding detouring and saving much valuable time.

If you don't have the late Rogers literature, you're not "up" on recent trailer developments. Write for the catalog today.

EXPERIENCE builds 'em

ROGERS HEAVY DUTY Gooseneck Trailers

PERFORMANCE sells 'em



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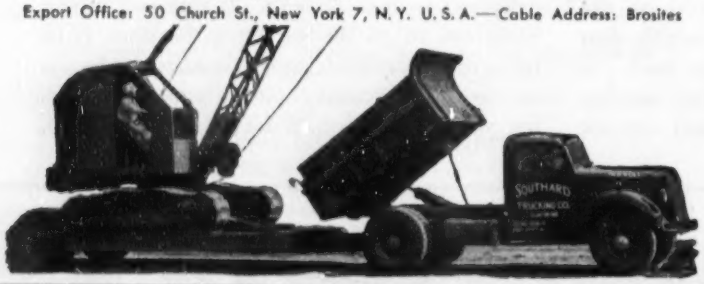
135 Orchard St.
Export Office: 50 Church St., New York 7, N. Y. U. S. A.—Cable Address: Brosites



Attaching of loaded Rogers Topalong trailer

J. T. Hardison & Son, Washington, N. C., LB $326,017, Sect. 4, water filtration plant;
Ferguson Corp., Hampton, Va., LB $364,313, Sec. 5, sewage disposal plant, WASHINGTON, N. C. City, C. O. Jordan mayor, Washington, N. C. Bids Feb. 24. Wm. F. Freeman Engineers, Inc., High Point, N. C. engr.

Ruscon Constr. Co., 149 E. Bay St., Charleston, S. C., LB $581,800. AUTOMOBILE SALES AGENCY, CHARLESTON, S. C. Fort Sumter Chevrolet Co., 182 Meeting St., Charleston, S. C. Bids Mar. 4. CD 2/25.

Chicago Bridge & Iron Co., Healey Bldg., Atlanta, Ga., LB $49,700, Contr. 1, storage tank,
Harold A. Pickens Constr. Co., Anderson, S. C., LB $52,792, Contr. 3, water mains, appurtenances, LAKE CITY, S. C. City, Lake City, S. C. Bids Mar. 2. CD 2/11.

† F. J. J. Sloat Dredging Co., Box 697, Slidell, La. LB $117,934, maintenance approx. 98,500 lin. ft. channel in Gulf Intracoastal Waterway, Vermillion Parish, Inv. 54-161, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans 9, La. Bids Mar. 4. CD 2/17.

Oman Constr. Co., Acklen Park, Nashville, Tenn., LB $358,194, slum clearance program, incl. grading, demolition, curbing, paving, installing sewers and other imprvs., MURFREESBORO, TENN. Murfreesboro Housing Auth., Murfreesboro, Tenn.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Illinois—B.A. 3/23—State Div. Waterways, State Capitol, Springfield, imprvt. project in Fox River in McHenry Co. CD 8/14/44.

▲ Ill., Chicago—B.A. 3/23—City, City Hall, auxiliary outlet sewers, Central South Side System 2-B, $1,000,000. CD 1/21.

† Illinois—B.A. 3/25—U. S. Eng., 420 Locust St. St. Louis 2, Mo., levees North Alexander Drainage and Levee District, Proj. Item 1, Alexander Co., CIVENG-23-065-54-85. CD 12/8/52.

BIDS ASKED—BUILDINGS

Ind., Anderson—SCHOOL—B.A. 3/23—Richland-Union School Corp., R.R. 4, Anderson, 1 and 2 story, 195x372 ft., L-shaped, brick, rein.-con., structural steel consolidated school. $500,000. Plans deposit $25. Hamilton & Graham, Western Reserve Bldg., Muncie, archts.

Ill., Round Lake—SCHOOL—B.A. 3/23—School District 116, c/o Fire Dept. Bldg., 2 story, bsmnt. high school. $700,000. Barry & Kay, 53 W. Jackson Blvd., Chicago, Zone 4, archts. CD 8/21.

▲ Ill., Chicago—HIGH SCHOOL—B.A. 3/25—St. Catherine of Sienna Parish, 5816 W. Washington St., high school. $1,500,000. Belli & Belli, 8 S. Dearborn St., Zone 3, archts. CD 10/26.

▲ Ind., New Albany—SCHOOL—B.A. 4/5—New Albany Bd. Educ., New Albany, Albany Junior High School $1,200,000. Hawkins & Walker, 216 Elsby Bldg., archts. CD 1/15.

Ind., Mishawaka—SCHOOL, etc.—Bids Asked—St. Bavo Catholic Church, 511 W 7 St., grade school and gymnasium. Maurer & Maurer, Lafayette Bldg., South Bend, archts.

Mich., Southfield—OFFICE—Bids Asked—Michigan Bell Telephone Co., 1365 Cass St., Detroit, brick, concrete dial exchange office, $300,000, Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, archt.

Wis., Mount Pleasant—SHIPPING—Bids Asked—S. C. Johnson & Son, Inc., 1525 Howe St., Racine, 2 story, 252x522 ft., steel, brick shipping bldg. John P. Halama, c/o owner, archt.

SOON LETS CONTRACT—BUILDINGS

Mich., Detroit—CRANE AND LOCKER DPT.—Chevrolet Motors Div., General Motors Corp., General Motors Bldg., soon lets contract crane and locker dpt., Argonaut Realty Div., General Motors Corp., General Motors Bldg., Detroit, archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Ruckman & Hansen, Inc., 3617 Leo Rd., Fort Wayne, IND. CA, $159,602, Branson St. concrete bridge, MARION, IND. Grant Co., Court House, Marion, Ind. Bids Mar. 1, awarded Mar. 2. CD 12/18/52.

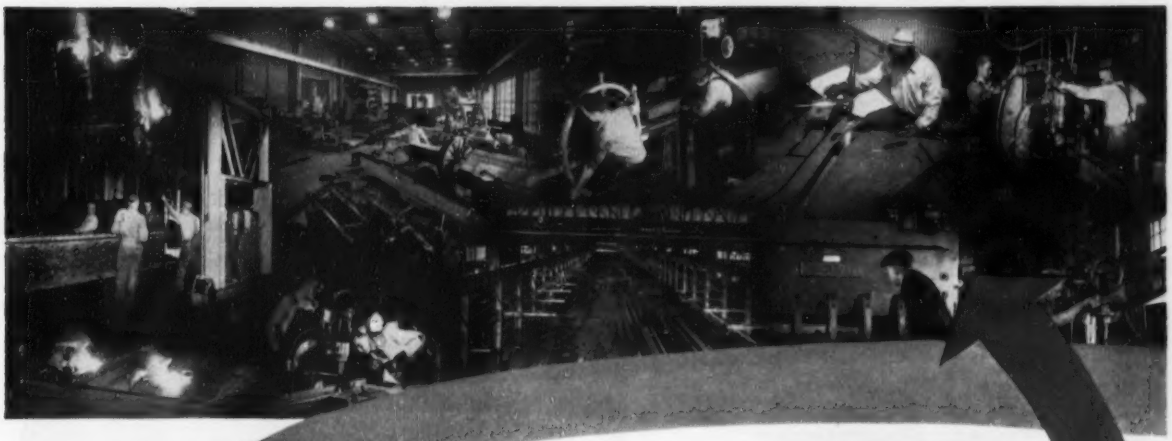
Sanitary District of Chicago, 910 S. Michigan Ave., Chicago 5, Ill., rejected bids Mar. 3, West South West Sewage Treatment Plant, CHICAGO, ILL. LB, $927,000. CD 2/18, under LB.

Ranney Water Method Co., 502 Park Ave., Columbus, O., CA, $180,000, gravel pack water collector, ZION, ILL. Lake Co. Water Bd. (Villages of Zion, Gurnee, Mundelein, Winthrop Harbour) Zion, Ill. Awarded Feb. 23. CD 12/15.

Reliance Constr. Co., Sheboygan, Wis., LB, $116,880 blt. surf., SHEBOYGAN, WIS. City, City Hall, Sheboygan, Wis. Bids Feb. 24. CD 2/18.

Gabes Constr. Co., Sheboygan, Wis., LB, $65,045, storm sewerage sys. addn., SHEBOYGAN, WIS. City, City Hall, Sheboygan, Wis. Bids Mar. 1.

Merritt-Chapman & Scott Corp., 260 Madison Ave., New York 16, N. Y. CA Est. $100,000. concrete, timber dock, Straits of Mackinac, MACKINAW CITY, MICH City, Mackinaw City, Mich.



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20 NORTH WACKER DRIVE, CHICAGO 6, ILLINOIS

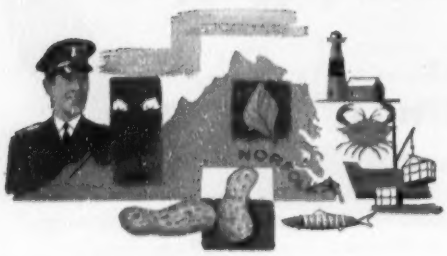
PLANTS IN

CHICAGO, ILLINOIS

HAMMOND, INDIANA AND

CLINTON, IOWA

Norfolk Prefers Concrete Pressure Pipe



Since 1921, Norfolk, Virginia, has been specifying concrete pressure pipe for its water supply and distribution system. Over 450,000 feet of pipe is now in use. Diameters range from 20″ to 48″.

Still in excellent condition is the 31,700 feet of concrete pressure pipe laid in 1921. There has been no necessity to take this pipeline out of service for any maintenance work; nor has the pipeline suffered from any trouble due to electrolytic action. This pipe is now carrying water at the same high capacity as when it was installed.

If your city wants pipe with an assured high-carrying capacity, decade after decade . . . if long term economy is a necessity . . . then look into the advantages of concrete pressure pipe when you plan your next transmission or distribution lines.

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Concrete PRESSURE Pipe

WATER FOR GENERATIONS TO COME

AMERICAN CONCRETE PRESSURE PIPE ASSOCIATION
228 North LaSalle Street
Chicago 1, Illinois

BUILDINGS

LOW BIDS AND CONTRACTS

Lion Constr. Co., 83 S. High St., Columbus, O. Owner Builds. $330,000, 44 frame HOMES, Joyful, Briggs and Glorious Rds., Franklin Twp., COLUMBUS, O.

Paugh & Brown Constr. Co., 6007 Euclid Ave., Cleveland, O., CA $368,863, brick elementary SCHOOL, Manhattan Dist., PARMA, O. Bd. Educ., 5401 W. 54 St., Parma, O. Fulton, Krinsky & DelaMotte, 6014 Euclid Ave., Cleveland, O., archts. Awarded Feb. 27. CD 11/5.

Central Indiana Gas Co., Muncie, Ind., Owner Builds, $325,000, imprvts. at local PLANT and new pipe lines, ANDERSON, IND.

▲ **Herlihy-Midcontinent Co.,** 135 S. La Salle St., Chicago 3, Ill., CA, $1,682,920, parking GARAGE, Madison and Wacker Dr., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Feb. 8, awarded Mar. 1. CD 2/16, under LB.

C. W. Haynes Co., 135 S. La Salle St., Chicago 3, Ill., CA, $750,000, 6 story OFFICE bldg. modernization, CHICAGO, ILL. Lions International, 201 N. Michigan Ave., Chicago, Ill. Bids Feb. 9, awarded Mar. 2. CD 2/3.

Greene & Gust, 1635 W. Grade St., Chicago, Ill., LB, $736,310 DORMITORY on campus, CHICAGO, ILL. Loyola University, 6525 N. Sheridan Ave., Chicago, Ill. Bids Mar. 2. CD 2/9.

G. L. Drollinger, 7120 S. Oakley Blvd., Chicago, Ill. Own Forces, $360,000, 29 HOMES in northwest district of CHICAGO, ILL.

Walter G. Orzula, Inc., 5807 W 35 St., Cicero, Ill., Own Forces. $400,000, 30 HOMES, CICERO, ILL.

▲ **Suriano Constr. Co.,** 4841 N. Damen St., Chicago, Ill. Own Forces, $1,000,000, 70 HOMES, FRANKLIN PARK-NILES, ILL.

N. B. Contractors, Inc., Hazlecrest, Ill., Own Forces, $300,000, 25 HOMES, HAZELHURST, ILL.

Deerfield Constr. Co., 707 Waukegan Rd., Deerfield, Ill., CA, $750,000. 25 HOMES, LAKE FOREST, ILL. John Griffith, Inc., 678 N. Western St., Lake Forest, Ill. Awarded Feb. 25.

Midway Building Contractors, 2835 Central Ave., Chicago, Ill., Own Forces, $500,000, 40 HOMES, in MORTON GROVE, ILL.

Howard Rockefellow, 621 Oakwood St., Geneva, Ill. Own Forces. $600,000. 40 HOMES westside of ST. CHARLES, ILL.

▲ **J. P. Cullen & Sons,** Janesville, Wis., CA, $2,875,499, general contract;

Pharo Heating Co., Inc., 1302 Regent St., Madison, Wis., CA, $401,116, heating, ventialting and plumbing, for HIGH SCHOOL, JANESVILLE, WIS. Bd. Educ., Janesville, Wis. Bids Jan. 28. CD 2/8, under LB.

Meredith Brothers, 929 S. 2 St., Milwaukee 4, Wis., CA, $560,000, 1 story, bsmt., 92x352 ft., parochial SCHOOL, MILWAUKEE, WIS. Immaculate Heart of Mary Catholic Congregation, W. Washington and S. 116 Sts., Milwaukee, Wis. A. J. Seitz, Racine, Wis., archt.

Christopher Constr. Co., 567 Middlesex St., Grosse Pointe, Mich. CA Est. $300,000. Pare Elementary SCHOOL, ST. CLAIR SHORES, MICH. City, St. Clair Shores, Mich. Bids Jan. 13. CD 1/5.

WEST OF MISSISSIPPI

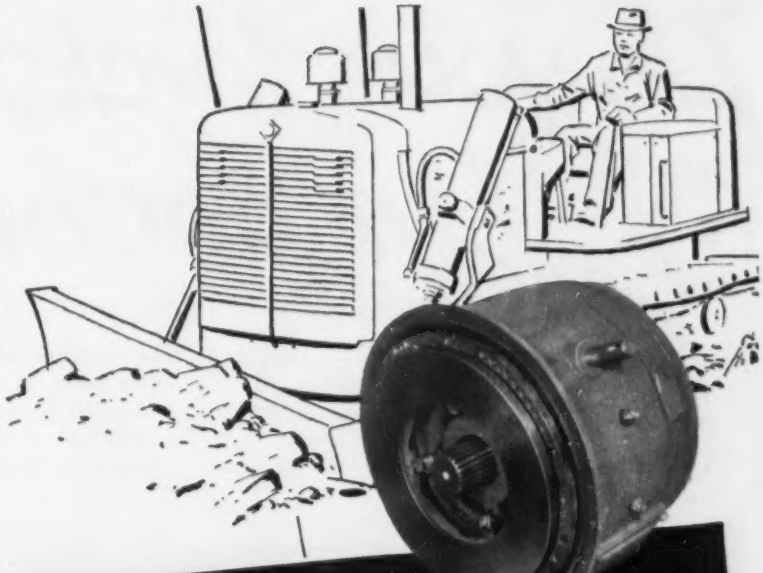
BIDS ASKED—HEAVY CONSTRUCTION

Mo., St. Louis—B.A. 4/6—City, c/o Frank J. McDevitt, pres. Bd. P. Service, 305 City Hall, 12 and Market Sts., chemical laboratory for Chain of Rocks pumping station of municipal water sys., incl. necessary remodeling of headhouse. $180,000. Study, Farrar & Majers, Arcade Bldg., 812 Olive St., Zone 1, archts. C. V. Briscoe, City Hall, dir. P. Utilities. CD 10/21.

Minn., Owatonna—B.A. 4/9—Steele Co., Marion Ditlevson, aud., imprv. Judicial Ditch No. 1 Branch 6, 8 and 8 Steele and Waseca Counties, excav., spill bank leveling, 45,482 lin. ft., 184,179 cu. yd., furnish, install 594 lin. ft. 12- to 48-in. CM pipe, 1,230 lin. ft. waterway, notch spillway dams, furnish, install 6,032 lin. ft. 8- to 16-in. concrete drain tile, rebuild masonry abutment bridge. $47,066.

▲† **Ark., Fort Smith**—HANGAR, etc.—B.A. 4/13—U. S. Eng., 300 Broadway, Little Rock, 203x212 ft., hangar, 100x160 ft., supply facility and armament storage; 37x101 ft. motor service shop; 20x15 ft., paint, oil and dope bldg., motor pool parking, crash truck station, aircraft fuel storage sys., motor vehicle fuel storage and dispensing sys., perimeter fence chain link fence, security fence, barbed wire, $3,000,000; pavement aircraft parking, connecting taxiway, Fort Smith Municipal Airport, for Air National Guard, $100,000-$500,000. CD 3/4.

▲† **Tex., Kelly Air Force Base**—SPECIAL DEPOT—B.A. 4/21—U. S. Eng., P.O. Box 1229, Galveston, Air Force Special Depot, Lot I, approx. 160,000 sq. ft., concrete frame, masonry building; Lot II, outside utilities, approx 3,000 lin. ft. 8 in. water distr.; approx. 1,900 lin. ft. 6 and 8 in. sanitary sewer, approx. 2,400 lin. ft. 9 ft. chain link fencing; approx. 4,500 lin. ft. track railroad (Govt. furnished rail and misc. steel); electric distr. sys., of approx. 4,000 lin. ft. 13.8 KV line; roads and parking areas of 2 in. asph. on 12 in. flexible base; drainage ditches, culverts, grading, sodding, Inv. No. ENG-41-243-54-73. $1,000,000-$3,000,000. CD 4/30/52.



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The Allis-Chalmers HD-20 and its predecessors was the pioneer in proving the value of Torque Converters (Twin Disc, of course) in heavy duty tractors. Now you can have the advantage of Twin Disc's famous Three-Stage Torque Converters in the Allis-Chalmers HD-15 Crawler, for better performance, faster work cycles, lengthened equipment life, easier and more efficient operation.

★ Get these advantages:

- Torque multiplication up-to-4:1 to get more work done.
- Smooth, steady application of power . . . better flotation.
- Engine operates in maximum efficiency range; automatically matches power to load demands.
- Eliminates engine lugging, reduces gear shifting, boosts operator efficiency.
- Absorbs shock loads . . . saves clutches, engine, drive line components, tracks.
- Maximum application of engine power.

Twin Disc Industrial and Truck-Type Torque Converters (Model CF, Clutch Type, as used in Allis-Chalmers HD-20 and HD-15, shown) are available in other models for varied applications, for standard industrial gas or diesel engines from 40 to 1,000 hp. Ask for Bulletin 135-D for over-all line; Bulletin 501 for Truck-Type Converters.

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If your trucks have a double function—operation on and off the highway—it will pay you to look into the big advantages offered by B Series Macks . . . the first completely new line of heavy-duty trucks offered by any manufacturer since World War II.

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Mack B-61S six-wheel dump truck, one of 26 Macks owned by A. H. Ferber, Jr., Green Village, N. J., shown working on construction of New Jersey's Garden State Parkway.

2206

Tex., Houston—TELEVISION STATION—Bids Asked—Houston Consolidated Television Co., c/o Roy Hoffheinz, c/o City Hall, Houston, Channel 13, television station. $750,000. CD 1/19.

BIDS ASKED—BUILDINGS

Ark., Little Rock—WAREHOUSE—B.A. 3/31—Safeway Stores, Inc., 216 Collins St., commercial warehouse, $300,000. Plans deposit $50. Extended date. H. Allen Gibson, Riegler Bldg., Little Rock, engr. Ginocchio-Cromwell & Assoc., Hall Bldg., archts. CD 2/24.

Tex., Austin—CLASSROOMS, etc.—B.A. 4/7—University of Texas, Main Admin. Bldg., Austin, classrooms and office structure for English Department. $950,000. Plans deposit $40. Broad & Nelson, 505 N. Ervay St., Dallas, archts. Mark Lemmon, 1210½ Main St., Dallas, super. archt. CD 7/9.

Tex., Freeport—CANNING PLANT—Bids Asked—Dow Chemical Co., Freeport, anti-freeze canning plant superstructure. $245,000. CD 3/8.

SOON LETS CONTRACT—BUILDINGS

Tex., Corpus Christi—WAREHOUSING—Central Power & Light Co., 120 Chaparral St., soon lets contract 1 story, 140x160 ft. bsmnt. warehouse, tilt-up concrete walls, concrete slab on fill. $110,000. Earl R. Ford, Jr., 305 S. Chaparral St., archt. Blucher & Naismith, 128 Mesquite St., engrs. CD 2/3/47.

Tex., Dallas—PLANT—Thompson-Hayward Chemical Co., 4900 Singleton Blvd., soon lets contract 1 story, 120x120 ft., face brick packing and production plant bldg., concrete drilled piers, excavation, grading, fill. $245,000. Tatum & Quade, 2812 Fairmount St., archts. CD 1/27.

Tex., Fort Worth—STORAGE—Records Storage Corp., 4th and Bailey Sts., Dallas, soon lets contract 96x171 ft. structural steel frame, masonry records storage, W. 4th St. and Bailey Ave. $150,000. Preston M. Geren, 1607 Fort Worth Natl. Bank Bldg., engr.-archt. CD 2/8.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul,

Hallett Constr. Co., Crosby, Minn. CA **$682,237.** c. conc. 13 mi. between 2 mi. north of Georgetown and Jct. TH 81 north of Hendrum, Clay Co.;

O. W. Swanson Constr. Co., 550 S. Snelling Ave., St. Paul, Minn. CA **$972,169.** grav. base, c. conc. b. conc. surf. 12.8 mi. between 12 Ave. in Forest Lake and Center City, Chisago Co. CD 2/25, under LB.

DeGraff Wolff Constr. Co., 2360 University Ave., St. Paul, Minn. CA **$67,958.** furnish, install storm sewers and sanitary sewer exten., PRINCETON, MINN. Village, R. C. Angstman, clk., Princeton, Minn. Bids Feb. 15. **CD 1/20.**

▲ **Orfei & Mariani**, 1156 Homer St., St. Paul, Minn. CA **$506,393.** 69,000 lin. ft. 9 in. V.S.P sanitary sewers;

Phelps-Drake Co., 1415 S.E. 8 St., Minneapolis, Minn. CA **$733,611.** 101,000 lin. ft. 9 in. V.S.P. sanitary sewers, RICHFIELD (MINNEAPOLIS P. O.), MINN. Village, P. H. Haugen, clk., Richfield, Minn. CD 3/1, under LB.

† **Midwest Pre-Cote Co.**, 7600 E. 17 St., Kansas City, Mo. LB **$125,305.** AFRTC roads at Grandview Air Force Base, Inv. 23-028-54-38, GRANDVIEW, MO. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Feb. 25. CD 1/27.

ARKANSAS—State Hy. Comn., Little Rock.

W. C. Burrows Co., Malvern, Ark., CA, **$197,500** Hollywood-East to West Road, Job 7420;

R. H. Davis, Stamps, Ark., CA, **$121,912**, Lewis-South Road, Job 3376;

Pardue & Humphries, Memphis, Tenn., CA, **$156,877** Wheatley-Moro Road, Job 11444. Grand total, $476,289. Bids Jan. 14, awarded Jan. 27. CD 7/20/53.

▲† **American Bridge Div., U. S. Steel Corp.**, 525 Wm. Penn Pl., Pittsburgh, Pa., CA **$2,626,913,** power line towers, for Big Bend-Granite Falls 230-kv transmission line from Missouri River Basin projects in central SOUTH DAKOTA to Western MINNESOTA, Spec. 4086. Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo. Bids Jan. 19. CD 1/29, under LB.

† **Rand Constr. Co.**, Rapid City, S. D., LB **$233,006,** administration facilities at Oahe Reservoir Proj., near Pierre, Inv. 25-066-54-22, SOUTH DAKOTA, U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Mar. 3.

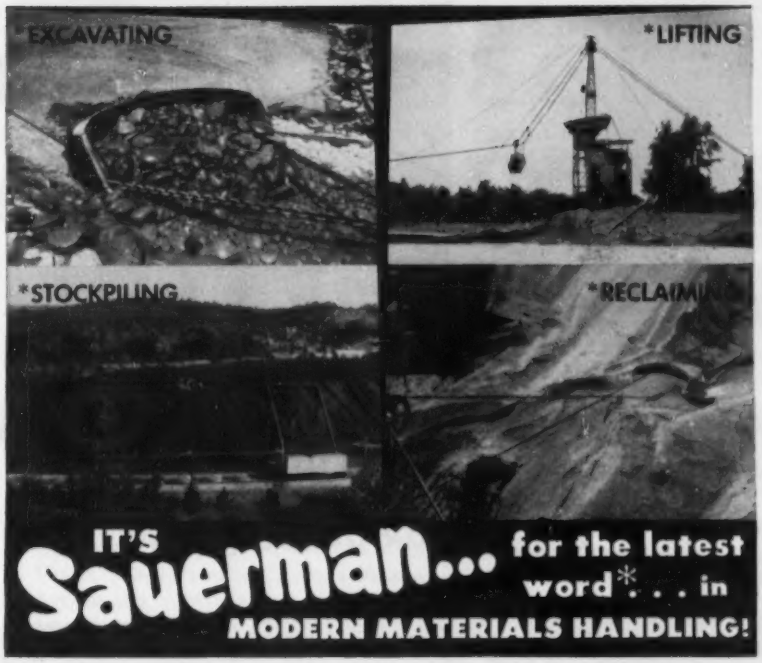
Train Constr. Co., Lindborg, Kan. LB **$55,921,** est. $73,230, earth fill dam McPherson County State Lake, near Canton, KANSAS. State, Forestry Fish & Game Comn., Pratt, Kan. Wilson & Co., 223 N. Santa Fe St., Salina, Kan., engrs. Bids Feb. 26.

Oklahoma Gas & Electric Co., 321 N. Harvey St., Oklahoma City, Okla. Owner Builds. **$700,000.** 40 mi. 161 KV transmission line from Harrah to Bristow, Creek Co., OKLAHOMA. Leo Lash, Oklahoma Gas & Elec. Bldg., Oklahoma City, Okla., engr. Awarded Mar. 4. CD 1/31/52.

John B. Martin Co., Commerce Exchange Bldg., Oklahoma City, Okla., CA **$369,883,** est. $394,000. livestock building at Fair Grounds, OKLAHOMA CITY, OKLA. City, City Hall, Oklahoma City, Okla. Sorey, Hill & Sorey, 809 N.W. 36 St., Oklahoma City, Okla., archts. Bids Jan. 26, awarded Feb. 23. (Correction—contractor). CD 2/2, under CA.

Nueces Electric Co-operative, C. M. Wagner, mgr., Robstown, Tex. Force Account. **$90,000,** some addnl. rural distr. lines, Live Oak Co., TEXAS.

City, Bellaire, Tex., Purchase and Hire. **$68,500,** some street imprvs., drainage, surf., BELLAIRE, TEX. CD 12/31.



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Upper left: 4-cu. yd. Crescent Scraper excavating from a river bottom, brings in a load of stone with very few fines for a western sand and gravel company.

Upper right: 2-cu. yd. Slackline Cableway spanning an average of 450 feet, lifts and conveys from an underwater deposit to a high hopper at the rate of 75 tph.

Lower left: 2-cu. yd. Crescent, working between a fixed head point and movable tail tower, reclaims phosphate from all points about the periphery of a roughly semi-circular storage area.

Lower right: 8-cu. yd. scraper machine is stockpiling 300 tons per hour, over an arc of 450 feet radius in a 225,000-sq. ft. storage area. Tail tower is remotely controlled from elevated cab above hopper.

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Send for these job-proven solutions to difficult problems:

EXCAVATING UNDERWATER WITH TRACTOR
Cleaning under bridges, culverts, canals, with tractor-scraper. EFR 209

INCREASING DRAGLINE CAPACITY 50%
How to increase capacity of boom machines from 50 to 300%, and range up to 400 feet. EFR 219

RECLAIMING LAND WITHOUT DREDGES
Building up lake and sea shore property ready for landscaping at low cost without dredges. EFR 211

CLEANING PONDS AND RESERVOIRS
At long last—a simple, economical method of cleaning ponds without draining. EFR 213

CUTTING DOWN HIGH BANKS FROM TOP
High-production method for excavating steep faces with no danger from slides. EFR 202

TWO NEW METHODS OF STRIP MINING
Removing overburden and pulling back into long stable slope all in one cycle. EFR 222, 203

DIGGING GRAVEL 65 FEET UNDERWATER
Taking gravel from pit 65 feet below water level, moving 500 feet to processing plant. EFR 214

ROBOT RECLAIMS FROM STORAGE PILES
This machine picks up, transports, and dumps automatically, alone and untended. EFR 225

DIGGING HARD-PACKED MATERIAL
Taking tightly-consolidated rock and gravel out of pit 85 ft. below water. EFR 216

REVETTING BANKS FROM MIDSTREAM
Floating towers and dragline grade banks, construct levees at minimum cost. EFR 103

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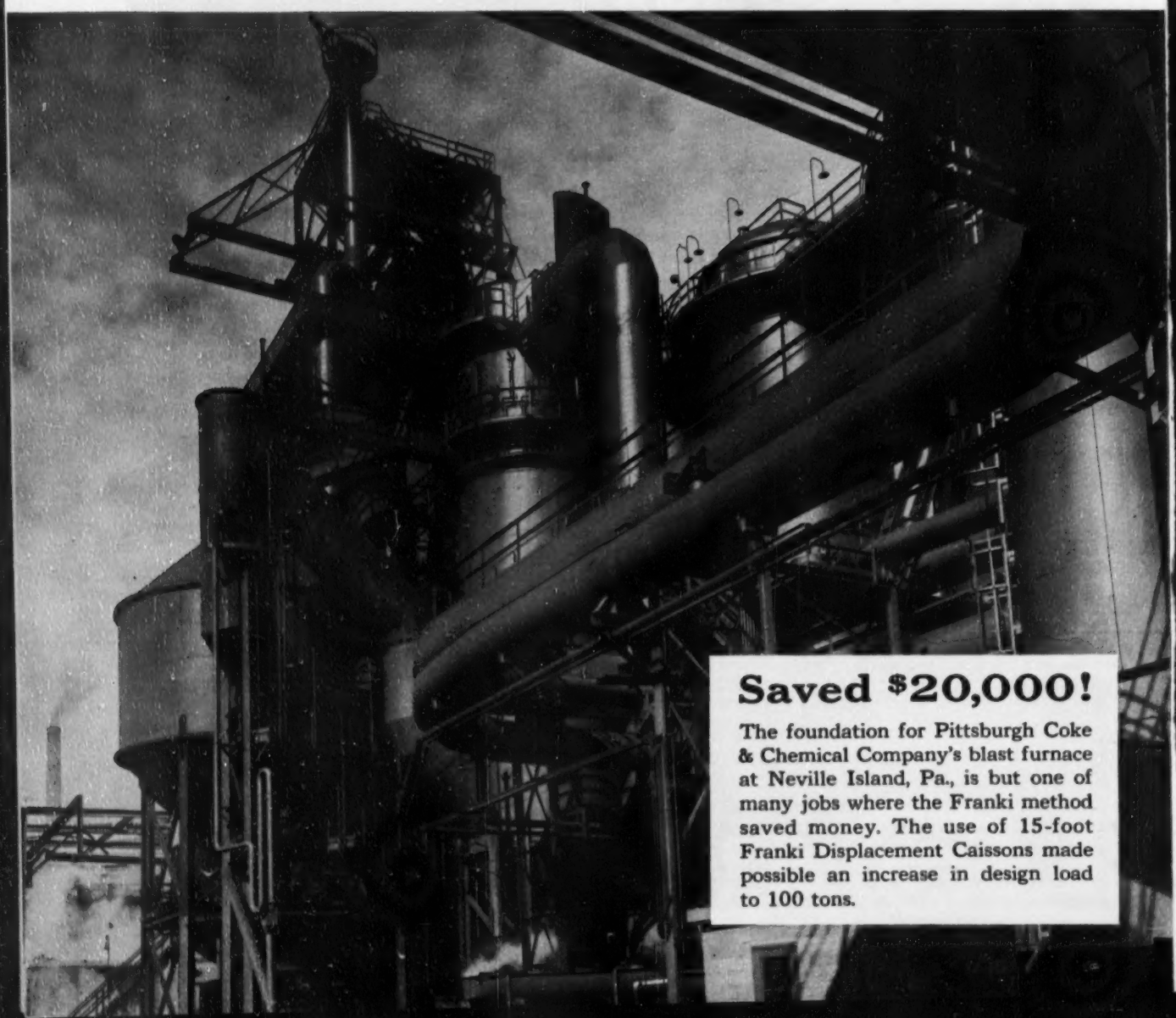

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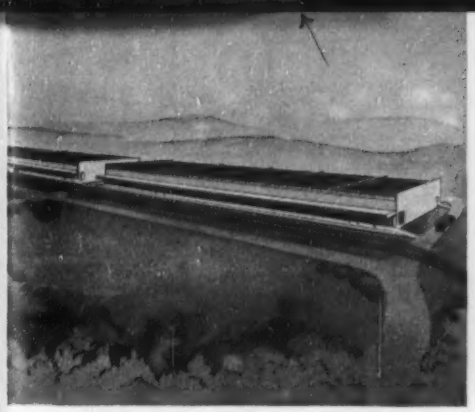
The foundation for Pittsburgh Coke & Chemical Company's blast furnace at Neville Island, Pa., is but one of many jobs where the Franki method saved money. The use of 15-foot Franki Displacement Caissons made possible an increase in design load to 100 tons.



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Franki installed 687 displacement caissons for the foundations of three U.S. Quartermaster Corps, warehouses at New Cumberland, Pa., saving the contractor and the government time, materials and money. The Franki method replaced specified conventional spread footings and eliminated excavating and backfilling.

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On job after job—throughout the world—the Franki method of foundation construction has been saving time, trouble, and money for contractors and their clients! For over 40 years, Franki Displacement Caissons have eliminated the need of special reinforcing and shells. Many, many times they are concreted without *any* reinforcing, due to the unusually great safety factor provided by the Franki method. To prove capacity, test loads of 150% of design load are frequently made; test loads as high as 200% are not uncommon —all with minimal settlement.

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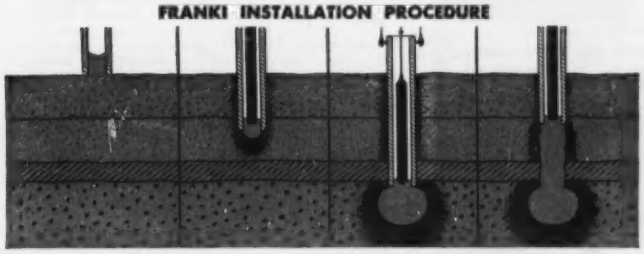

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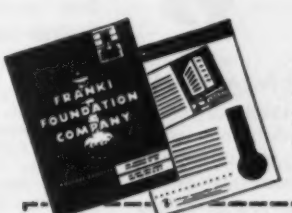

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City, Bellaire, Tex., Purchase and Hire. $70,000, some sewage disposal plant rehabilitation and imprvs.; Own Forces, $77,165, addnl. drainage, imprv., enlarging secondary drainage sys., BELLAIRE, TEX. Joe Noser, city engr. CD 12/16.

E. J. Waitman, 218 W. Buchanan St., Harlingen, Tex. LB $169,995, Site 1, State 1, Contr. 4, Padre Island Park Work at Padre Island, BROWNSVILLE, TEX. Cameron Co., Court House, Brownsville, Tex. Parsons, Brinckerhoff, Hall & Macdonald, Bankers Mortgage Bldg., Houston, Tex., engrs. T. D. Dozier, Brownsville, co. engr. Bids Feb. 25. CD 2/17.

John G. Holland Constr. Co., 1502 Old Spanish Trail, Houston, Tex., CA $69,170, grading, hard type paving, for addnl. auto parking area, lighting exten., HOUSTON, TEX. Sears Roebuck & Co., Wayside Dr., Houston, Tex. CD 3/7/52.

L. R. Pletz, c/o South Texas Blvd., San Antonio, Tex. Own Forces. $37,100, c.i. water lines, SAN ANTONIO, TEX.

L. R. Pletz, South Texas Blvd., San Antonio, Tex. Own Forces. $60,000, storm sewers; $66,000, sanitary sewers, SAN ANTONIO, TEX. CD 2/25.

L. R. Pletz, South Texas Blvd., San Antonio, Tex. Own Forces. $66,000, building new streets and hard type topping, SAN ANTONIO, TEX.

City Public Service Bd., 201 N. St. Marys St., San Antonio, Tex. Own Forces. $100,000, some rehabilitation work on gas mains, SAN ANTONIO, TEX. CD 6/4.

City P. Service Bd., 201 N. St. Marys St., San Antonio, Tex. Own Forces. $100,000, water mains rehabilitation work, SAN ANTONIO, TEX. CD 8/20/52.

† **D. W. Falls Constr. Co.**, 135 N. Sheridan St., Tulsa, Okla., LB $109,511, est. $118,136, earthwork, clearing and structures for rehabilitation of drains, Unit BW-2, Middle Rio Grande Proj., Spec. DC-4110, NEW MEXICO. Bureau Reclamation, Dpt. Interior, Albuquerque, N. M. Bid Feb. 18. CD 1/19.

▲† **Robert E. McKee, General Contractor, Inc.**, Box 651, Albuquerque, N. M., CA $2,197,778. airfield pavement, Kirtland Air Force Base, Inv. No. Eng-29-005-54-79, ALBUQUERQUE, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Feb. 16, awarded Mar. 3. CD 2/24, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Fleisher Eng. & Constr. Co.**, Builders Exchange Bldg., Minneapolis, Minn. and **C. A. Peterson & Sons**, Builders Exchange Bldg., Minneapolis, Minn. CA $1,752,000. general contract HIGH SCHOOL, HOPKINS, MINN. Bd. Educ., R. Child, clk., Hopkins, Minn. (Correction—latter contractor's address). CD 3/4, under CA.

▲ **W. Baumeister Constr. Co.**, 624 Hamm Bldg., St. Paul, Minn. CA $2,500,000. general contract 8 story, bsmnt., 70x266 ft. OFFICE, Victory Square, Cedar St., ST. PAUL, MINN. Minnesota Mutual Life Insurance Co., 156 E. Sixth St., St. Paul, Minn. Bids Feb. 23. CD 1/27.

T. A. Carlo Co., 1118 Tile Guaranty Bldg., St. Louis 1, Mo. LB $783,352. general contract 1 and 3 story, ground floor, 75x298 ft., 140x142 ft., brick, rein.-con., steel, L-shaped elementary SCHOOL M-1-4, at 1212 N. 22 St., ST. LOUIS, MO. Bd. Educ., V. Harry Rhodes, comr School Bldgs., 911 Locust St., St. Louis 1, Mo. Bids Mar. 1. CD 2/15.

L. John Moresi Realty & Constr. Co., 6522 Clayton Rd., St. Louis 24, Mo. Owner Builds. $500,000. eighteen to twenty 1 story, brick, frame, stone combination RESIDENCES, Crickelwood south side of Clayton Rd. west of Geyer Rd., ST. LOUIS COUNTY, MO.

▲ **Ditmars-Pickens & Bond**, Gazette Bldg., Little Rock, Ark., CA, $1,600,000, OFFICE addn., HOT SPRINGS, ARK. Southwestern Bell Telephone Co., 715 Louisiana St., Little Rock, Ark. Awarded Feb. 24. CD 4/29.

▲ **Peter Kiewit Sons Co.**, Omaha National Bank Bldg., Omaha, Neb., CA $1,771,132, general constr.;

Natkin & Co., 4001 Leavenworth St., Omaha, Neb., CA $708,490, mechanical for HOSPITAL, OMAHA, NEB. Clarkson Hospital, 26 and Dewey Aves., Omaha, Neb. Bids Mar. 2. CD 1/27.

▲ **University of Wichita**, 1845 Fairmount St., Wichita, Kan. rejected bids Feb. 25, field house-auditorium, WICHITA, KAN. LB $1,888,734. gen., $834,000. mech. CD 1/28.

Milling Engineers, Inc., 1911 Baltimore St., Kansas City, Mo. CA. Approx. $375,000. 1,000,000 bu. GRAIN STORAGE ELEVATOR, SHAWNEE, OKLA. Shawnee Milling Co., Shawnee, Okla. Awarded Feb. 25. CD 3/3.

Attebury Elevator Co., Amarillo, Tex. Owner Builds. $90,000, rein.-con. type GRAIN ELEVATOR, AMARILLO, TEX. CD 2/17.

Sanders Constr. Co., Box 2, Sherman, Tex., LB $496,100, general constr. 1 story brick, tile HIGH SCHOOL, concrete floor slabs, fdn., etc. BOVINA, TEX. Bovina Independent School Dist., Bovina, Tex. Bids Feb. 17, awarded Mar. 2. CD 2/1.

Carpenter Bros., 1335 Plowman St., Dallas, Tex., CA $765,000. incl. Alt. 1, 6, 7, EDUCATIONAL BLDG., DALLAS, TEX. First Presbyterian Church, 407 S. Harwood St., Dallas, Tex. Bids Jan. 28, awarded Mar. 3. CD 2/9, under LB.

Manhattan Constr. Co., 2828 Pease St., Houston, Tex. LB $687,000. interior work, masonry type CLUB BLDG., HOUSTON, TEX. Houston Club Building, c/o J. Rus Baty, Lamar Annex, and Wilson, Morris & Crain, 3330 Graustark St., Houston, Tex., archts. Robert J. Cummins, 4526 Bellaire St., Dales S. Cooper & Assocs., 420 Sul Ross St., Houston, Tex., engrs. CD 1/13.

Pittman Grain Co., Hereford, Tex., Purchases, Day Labor. Approx. $250,000. 550,000 bu. rein.-con. GRAIN ELEVATOR, HEREFORD, TEX. CD 2/12.

Larkstone Constr. Co., 9102 Jensen Dr., Houston, Tex. Owner Builds. $355,000, Sect. 4, 41 frame DWELLINGS, concrete slab fdn.; $348,500, Unit 5, 38 frame DWELLINGS, concrete slab fdn., HOUSTON, TEX. CD 12/18.

Lakeview Corp., 204 Winkler Dr., Houston, Tex. Own Forces. $348,000, eight 1 and 2 story masonry DWELLINGS, HOUSTON, TEX. CD 1/27.

Fisher Constr. Co., Box 6325, Houston, Tex., LB $503,605. est. $500,000. 3 story main bldg., and 1 story wing, 44,000 sq. ft., concrete frame, brick Bagby Branch Y.M.C.A. BUILDING, Wheeler and Sampson Sts., HOUSTON, TEX. Young Men's Christian Assn., 1600 Louisiana St., Houston, Tex. Bids Feb. 24. CD 2/15.

Jack Cassidy, Builder, c/o Overbrook Addn., Houston, Tex. Owner Builds. $328,150, 28 DWELLINGS; $320,000, 22 DWELLINGS, near HOUSTON, TEX. CD 1/29.

Union Compress & Warehouse Co., 2601 Avenue B, Muleshoe, Tex., Purchase and Hire. $245,000. COMPRESS, MULESHOE, TEX. CD 2/17.

Van Cleave Constr. Co., Box 12176, Houston, Tex., CA $541,185. two DORMITORIES, Alexander Hall for Boys, and Suarez Hall for Girls, PRAIRIE VIEW, TEX. Agricultural & Mechanical College of Texas, 331 Admin. Bldg., College Station, Tex. Bids Feb. 23, awarded Mar. 2. CD 3/1, under LB.

Morrison-Knudsen Co., 319 Broadway, Boise, Idaho. CA $735,000. general contract Anaconda Senior High SCHOOL, ANACONDA, MONT. Anaconda School Dist., Anaconda, Mont. Bids Mar. 1. CD 11/9.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Idaho**—B.A. 3/25—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., Schedule 1, Item 1, 40 trashracks, Item 2, 84 trashracks for outlet and power intake structures, Palisades Dam, Palisades Proj. Spec. DS4131. L. N. McClellan, ch. engr. CD 9/14/44.

▲ **CALIFORNIA**—B.A. 3/31—State Div. Hys., P. Wks. Bldgs., Sacramento,

Humboldt Co.—grading, 2 bridges, widening 2 bridges 5.1 mi. north of Eureka $960,000;

Kings Co.—grading surf. portions 7.7 mi. of Hy. north of Corcoran, $400,000.

Lake Co.—grading, seal coat 1.4 mi. near Napa-Lake County Line, $350,000.

Shasta Co.—grading, surf. 5.2 mi. between Sulphur Creek and Project City, $750,000;

Trinity Co.—grading, surf., widening bridge 1.8 mi. between Weaverville and Douglas City, $390,000.

Tulare Co.—grading, surf. on 4.6 mi. Liking Daly Rd., $225,000. CD 12/23.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Puget Sound Bridge & Dredging Co.**, 2929 16th Ave. S.W., Seattle, Wash. and **General Constr. Co.**, 3840 Iowa St., Seattle, Wash., CA $765,155. excavate in Reserve Fleet Mooring Basin, Cathlamet Bay, Civeng-35-026-54-104, Clatsop Co., OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Mar. 5. CD 2/25.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,

R. R. Hensler, 7550 Fleetland Ave., Sun Valley, Calif., CA, $654,413, grading, surf., 2 bridges 2.4 mi. near Lord Creek and Fillmore, Ventura Co. Bids Feb. 11, awarded Mar. 5. CD 2/17, under LB.

▲ **Tumblin Co.**, 2901 "H" St., Bakersfield, Calif., LB, $1,161,000, Site Development "A" and "B" and Stadium, BAKERSFIELD, CALIF. Kern County High School and Junior College District, 312 Bernard St., Bakersfield, Calif. Bids Feb. 26. CD 2/12.

W. E. McKnight Constr. Co., 14913 E. Ramona Blvd., Baldwin Park, Calif., CA, $134,057, site imprvts. grading, curbs, gutters, roads, LOS ANGELES, CALIF. Prudential Insurance Co. of America, 5757 Wilshire Blvd., Los Angeles, Calif. Barnett, Hopen & Smith, 35 S. Raymond St., Pasadena, engrs.

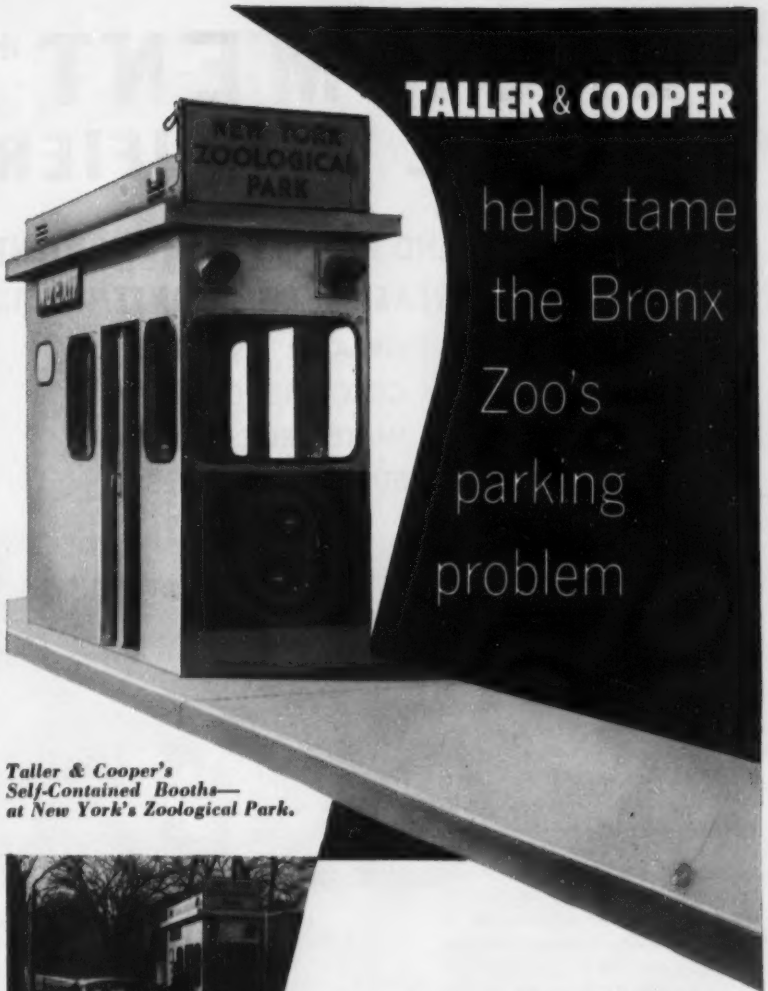
Earl Brown, 2074 Benedict Canyon, Beverly Hills, Calif., CA, $99,390, preparation of site for Westchester SCHOOL, Westchester, LOS ANGELES, CALIF. Los Angeles Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Feb. 25. W. L. Bangham, 809 Yale Ave., Los Angeles, Calif., engr. CD 3/2, under Public Buildings.

George E. Hickey, 16106 Cohasset St., Van Nuys, Calif., CA $66,851, street imprvs. at Van Owen-Coldwater Junior High School, North Hollywood, LOS ANGELES, CALIF. Los Angeles Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Feb. 26, awarded Mar. 1. CD 6/13/52, under Public Buildings.

† **Coopman Electric Co.**, 81 14 St., San Francisco, Calif., LB, $84,444, outside distr. and transformer rooms at Veterans Administration Hospital, PALO ALTO, CALIF. Veterans Admin., Munitions Bldg., Wash., D. C. Bids Mar. 2. CD 1/18.

Jos. J. Brady, 1608 Maryland St., Redwood City, Calif., LB, $53,831, drainage on San Pedro Creek, REDWOOD CITY, CALIF. San Pedro Drainage District, Court House, Redwood City, Calif. Bids Mar. 2.

Griffin & Ince, 2006 N. Tielman St., Fresno, Calif., LB, $54,456, water mains and sanitary sewers, TULARE, CALIF. City, City Hall, Tulare, Calif.



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BUILDINGS

LOW BIDS AND CONTRACTS

Newland Constr. Co., 1411 Rucker Ave., Everett, Wash. LB, $472,419, general contract 1 and 2 story, 134x302 ft. OFFICE and STORAGE BLDG. and 64x88 ft. steel frame GARAGE, EVERETT, WASH. Snohomish County Public Utility District No. 1, Everett, Wash. Bids Mar. 4. CD 1/28.

Waale-Campian Co., 2100 S.W. Jefferson St., Portland, Ore. CA, $676,500, 2 story, 93x266 ft., steel Columbia High SCHOOL addn., RICHLAND, WASH. School District 400, Richland, Wash. Bids Feb. 25. CD 3/3, under LB.

G. W. Gwinn, 17810 Ballinger Way, Seattle, Wash. CA, $86,000, altering, remodeling clothing FACTORY, SEATTLE, WASH. Black Mfg. Co., 1130 Rainier Ave., Seattle, Wash.

Most Rev. J. P. Dougherty, Bishop of Yakima, c/o St. Joseph's Parish, Wenatchee, rejected bids Jan. 12, 39,000 sq. ft. frame parochial SCHOOL for St. Joseph's Parish, WENATCHEE, WASH., $300,000. Will re-advertise. CD 1/8.

Pacific Coast Builders, 2530 18 St., San Francisco, Calif., LB, $458,000 SCHOOL, CHURCH and RECTORY, Our Lady of Grace Parish, CASTRO VALLEY (Br. Hayward), CALIF. Roman Catholic Archbishop, 1100 Franklin St., San Francisco, Calif. Bids Mar. 2. CD 2/26.

Aldous Co., 2006 S. La Cienega St., Los Angeles, Calif., CA, $250,000, 60,000 sq. ft. FACTORY addn., DOWNEY, CALIF. North American Aviation, 12241 Lakewood Blvd., Downey, Calif.

▲ **Malvern & Nicklas**, 3411½ N. La Brea Ave., Los Angeles, Calif., CA, $1,249,781, 68,000 sq. ft. MUSIC BLDG., LOS ANGELES, CALIF. University of California, 405 Hilgard Ave., Los Angeles, Calif. Bids Jan. 16. CD 2/23, under LB.

D. W. Nicholson, 1701 San Leandro Blvd., San Leandro, Calif., CA, $500,000, PLANT addns., modernization, NILES, CALIF. Kraft Tile Co., Niles, Calif.

W. R. Kalsched & Co., 201 San Jose Ave., San Jose, Calif., LB, $459,000, CHAPEL and CONVENT addns., MISSION SAN JOSE, CALIF. Dominican Sisters of Mission San Jose, Mission San Jose, Calif. Arnold & Francis Constable, 95 Spender Ave., Sausalito, Calif., archts.

† **Quiller Constr. Co., Inc.**, 8607 Santa Monica Blvd., Los Angeles, Calif., LB, $461,132, propellant facilities, at jet propulsion laboratory, ENG-04-353-54-38, PASADENA, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Feb. 26. (Correction—cost.) CD 3/5.

▲ **Swinerton & Walberg**, 225 Bush St., San Francisco, Calif., LB, $2,118,843, Sierra HIGH SCHOOL, 20 Ave. and Stratford Way, SAN MATEO, CALIF. Roman Catholic Archbishop, 1100 Franklin St., San Francisco, Calif. Bids Mar. 2. CD 2/25.

▲ **Williams & Burrows**, 18 W. Orange St., South San Francisco, Calif., CA, $1,404,670, Village High SCHOOL, SAN LORENZO, CALIF. Hayward Union High School District, 22300 Foothill Blvd., Hayward, Calif. Awarded Feb. 20. CD 8/13.

Flowers & Shirley, 559 Island St., Tulare, Calif., CA, $322,179, school bldgs. at elementary and high school sites, SIMI, CALIF. Simi Unified School District, Simi, Calif. Caughey & Ternstrom, C. M. Deasy, 8717 W. 3 St., Los Angeles, Calif., archts.

Shepherd & Green, 309 American Trust Bldg., Stockton, Calif., CA, $84,000, motor truck SERVICE PLANT on U. S. Hy. 99 North, STOCKTON, CALIF. Wilburn Lillie, c/o Ohm & Eckland, engr., 123 N. El Dorado St., Stockton, engrs.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

▲ **Alta., Edmonton**—B.A. 4/15—Municipality, City Hall, sewage disposal plant. $1,500,000. J. D. A. MacDonald, city engr. associated with Gore & Storrie, 1130 Bay St., Toronto, Ont., engrs. CD 10/21.

BIDS ASKED—BUILDINGS

Que., Montreal—SCHOOL—B.A. 3/22—Protestant Bd. School Comn., T. Sommerville, secy. L-shaped Tetreaultville School, Marseille and Lebrun Sts. $325,000. Plans deposit $150. Nobbs & Nobbs, 620 Cathcart St., archts.

▲ **Ont., Woodstock**—HOSPITAL—B.A. 3/26—Woodstock General Hospital, Woodstock, 3 and part 4 story, brick, concrete, T-shaped, 50,000 sq. ft. hospital addn. $1,000,000. Wallace, Carruther, & Assocs. 35 Isabella St., Toronto, engrs. D. E. Kertland, 36 Summerhill Gardens, Toronto, Ont., archt. CD 4/29.

Alta., Edmonton—GARAGE—B.A. 4/6—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., 50-vehicle garage and P.O. Service Station, Job 3024, $400,000. Plans deposit $100.

SOON LETS CONTRACT—BUILDINGS

Ont., Dunnville—FACTORY—Sylvania Electric Co. of Canada, Ltd., University Tower Bldg., Montreal, Que., soon lets contract 1 story, part 2 story 200x250 ft., steel, brick, concrete factory, $500,000. S. G. Chipman Co., 234 Queens Ave., London, engr. CD 1/20.

Que., Montreal East—REFINERY—Canadian Copper Refiners Ltd., 7 Durocher St., soon lets contract electrolytic refinery. $500,000. J. Mellow, c/o owner, engr.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Mannix Ltd., & Bannister Constr. Ltd.,** Northern Hardware Bldg., Edmonton, Alta., and **Anderson International Contractors Ltd.,** Rawleigh Bldg., Edmonton, Alta., CA, $4,800,000; 454 mi. 24 in. oil pipe line from Edmonton to Gretna, Man.

R. H. Fulton & Co., Lubbock, Tex., U. S. A., CA, $3,052,000, 184 mi. 26 in. pipe line from Gretna, Man. to Superior, Wis., ALBERTA, SASKATCHEWAN, MANITOBA ONTARIO and WISCONSIN, Interprovincial Pipe Line Co. Ltd., 50 King St. West, Toronto, Ont. Awarded Mar. 1, CD 4/16.

Johns-Manville Co. Ltd., 1206 Homer St. Vancouver, B. C. CA, $426,710 supply 45 mi. transite pipe, varying 4- to 12-in. for renewal of existing water mains. BURNABY, B. C. Municipality, Municipal Hall, Burnaby, B. C. Bids Feb. 15, awarded Mar. 1. CD 2/4.

▲ **A. Janin & Co. Ltd.,** 1460 Sherbrooke St. W., Montreal, Que., CA, $1,159,154, various buildings and services at R. C. A. F. Station, CASEY, QUE. Defence Constr. Ltd., 7000 Park Ave., Montreal, Que. M. P. McAndrew, c/o owner, engr. Bids Jan. 26. CD 12/24.

BUILDINGS

LOW BIDS AND CONTRACTS

Frid Constr. Co. Ltd., 128 E. King St., Hamilton, Ont., CA, $500,000, 6 story, concrete, steel PLANT addn., HAMILTON, ONT. Dominion Foundries Ltd., 14 Depew St., Hamilton, Ont. R. A. Hanright, 107 Yates St., St. Catherines, Ont., engr. CD 2/15/49.

Ross-Meagher Ltd., 9 Echo Dr., Ottawa, Ont., LB, $850,000, Plant Products LABORATORY, at Central Experimental Farm, OTTAWA, ONT. Dept. P.Wks., Hunter Bldg., Ottawa, Ont. Bids Mar. 3. CD 2/3.

C. A. Smith Contg., Co. Ltd., 1048½ Kingston Rd., Toronto, Ont., LB, $300,000 "Mineola" Public SCHOOL, Windy Oaks Sts., PORT CREDIT, ONT. South Peel Board Educ., Port Credit, Ont. Bids Feb. 16. CD 2/4.

Carter Constr.. Co. Ltd., 419 Cherry St., Toronto, Ont. CA, $500,000, GRAIN STORAGE ELEVATOR, 10 SILOS, TORONTO, ONT. Victory Mills, Ltd., 285 Fleet St. E., Toronto, Ont. Peter C. Brzozowicz, 4 Wellington St. E., Toronto, Ont., engr. T. G. Ferguson, c/o owner, ch. engr. Awarded Mar. 2. CD 6/7/46.

Ascent Constr. Co., 600 Eglinton Ave. W., Toronto, Ont., CA, $500,000, 6 story, 59 suite bsmnt., sub-bsmnt. garages concrete, brick, frame APARTMENT BLOCK, Eglinton Ave. W. and Chaplin Crescent, TORONTO, ONT. Owner, c/o Peter Caspari, archt., 102 Eglinton Ave. E., Toronto, Ont., W. V. Zinn & Assoc., 102 Eglinton Ave. E., Toronto, Ont., engrs. Awarded Mar. 1.

Hill-Clark Francis (Quebec) Ltd., Noranda, Que., CA, $540,896, Indian Residential SCHOOL, near AMOS, QUE. Dpt. Citizenship & Immigration, Dom. Govt., Ottawa, Ont.

▲ **Bisson Construction Engineering Co.,** 370 Maisoneuve St., Hull, Que., Owner Builds. $5,000,000, 500 DWELLINGS, south of HULL, QUE. CD 7/14/50.

Cecil Carpenter & Co. Ltd., 5139 Decarie Blvd., Montreal, Que., LB, $420,100, Meadowbrook SCHOOL, 52 Ave. and Sherbrooke St., LACHINE, QUE. Protestant School Comn. of Lachine, Mrs. I. M. Robbins, secy., Lachine, Que. Bids Mar. 2. CD 2/10.

L. P. Theriault Ltd., 5346 Dupuis Ave., Montreal, Que., CA, $160,000, 1 story, bsmnt., concrete, brick FACTORY addn., MONTREAL, QUE. Viau Ltd., 4591 E. Ontario St., Montreal, Que. CD 9/22/52.

Anglin-Norcross Quebec Ltd., 892 W. Sherbrooke St., Montreal, Que., CA, $250,000, MACHINE SHOP and FURNACE ROOM addns., MONTREAL, QUE. Dominion Glass Ltd., 1111 Beaver Hill, Montreal, Que. G. D. Thompson, 1241 Guy St., Montreal, Que., archt. CD 5/5/50.

▲ **Continental Housing Corp.,** 4265 St. Zotique St., Montreal, Que., Owner Builds, $1,000,000, 85 HOUSING UNITS on Sherbrooke St. E., MONTREAL, QUE. O. P. Bois, 8405 Drabel St., Montreal, Que., archt. CD 7/23/51.

▲ **Wentworth Development Corp.,** 1255 Phillips Sq. Montreal, Que., Owner Builds, $3,000,000. 270 one story, bsmnt., 29x42 ft. and 31x40 ft. concrete, brick BUNGALOWS, MONTREAL, QUE. G. Jarry, 7271 Querbes Ave., Montreal, Que., archt.

ALASKA

BIDS ASKED—HEAVY CONSTRUCTION

† **Alaska, Anchorage**—RADAR BLDG.—B.A. 4/6—Civil Aeronautics Admin., P.O. Box 440, Anchorage, frame precision approach radar bldg., at International Airport, Inv. 5-54-229. CD 4/2/47.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

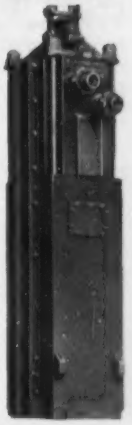
▲† **Peter Kiewit Sons Co.,** 1300 Aloha St., Seattle, Wash., CA $3,319,241, est. $3,154,000, paving roads, streets and walks, Ladd Air Force Base, Inv. 54-4, ALASKA. U. S. Eng., Anchorage, Alaska. Bids Feb. 17. CD 2/25, under LB.

† **Boen-Egge-Cummins-Koon Constr. Co.,** 3647 Stone Way, Seattle 3, Wash., CA $109,876, est. $124,015, ILS facilities, with buildings, access road, parking area, etc., Eielson Air Force Base, ENG-95-507-54-85, ALASKA. U. S. Eng., Anchorage, Alaska, Bids Mar. 4. CD 2/15.

4940 PILES DRIVEN without a hitch!

McKiernan-Terry Hammer driving the first concrete pile at the Terminal de Pasajeros in La Guaira, Venezuela. Frederick Snare Corporation, Contractors.

Four McKiernan-Terry Type S-8 Single-Acting Pile Hammers were used to drive 4940 concrete and steel piles on this important project . . . making a typically perfect McKiernan-Terry record • Three of the hammers drove a total of 4000 18-inch square concrete piles, of 57-ft. average length. A fourth S-8 hammer drove 940 14-inch steel H-piles averaging 53-ft. in length • The report on this job states: "The performance of these hammers was excellent. All piles were driven to 63 tons bearing capacity, no mechanical difficulties were ever experienced with any of the hammers, and no repair parts had to be ordered." • Upon completion of the job, all four McKiernan-Terry Hammers were still in excellent condition, capable of a lot more work without requiring attention • This performance record illustrates why so many contractors choose McKiernan-Terry Pile Hammers for speedy, accurate and economical pile driving. 11 Double-acting hammers, 5 single-acting hammers and 2 extractors are available in the complete McKiernan-Terry line. Write for bulletin giving full data.



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McKIERNAN-TERRY CORPORATION, MANUFACTURING ENGINEERS • 13 PARK ROW, NEW YORK 7, N. Y.
Plants: Harrison, N. J., Dover, N. J. MK-283

† **Kincaid & King Constr. Co.**, Spenard, Alaska, LB $727,340, est. $765,325, 2 story bamt., 48x120 ft. rein.-con., masonry laboratory bldg., 1 story, 38x100 ft. supply bldg., 1 story, 38x100 ft. shop, 1 story, 13x24 ft. storage bldg., for Arctic Aeromedical Laboratory, Inv. ENG-95-507-54-75, Ladd Air Force Base, ALASKA. U. S. Eng., Anchorage, Alaska. (Correction—low bidder). CD 3/3, under LB.

† **Pacific-Alaska Contractors, Inc.**, 2907 A St., Tacoma, Wash., CA $311,452, est. $335,782, water, sewer, steam and electrical distr. sys., and install electric power facilities for pumps in saltwater pump house, Inv. 54-20, WHITTIER, ALASKA. U. S. Eng., Anchorage, Alaska. Bids Feb. 26. CD 2/17.

LATIN AMERICA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Foley Bros., Inc.**, Vermilyea St., Pleasantville, N. Y. CA. Total est. cost with equipment $67,000,000. 135 mi. jungle railroad to connect Serra do Navio Manganese deposits with port installations on Amazon River, near Macapa, construction includes port facilities, BRAZIL. Industria e Comercio de Minerios S.A., c/o Govt. of Brazil, Rio de Janiero, Brazil.

Proposed Projects

WATER SUPPLY

▲ **Calif., Los Angeles**—Los Angeles Dpt. Water & Power, 207 S. Broadway, enlarging Lower Stone Canyon Reservoir, by raising dam, new tower. $4,000,000. S. B. Morris, c/o owner, engr. CD 2/8/52, under Public Buildings.

Ind., Jasper—City, Mayor Edward J. Lorey, raising Patoka River Dam by 3 addnl. ft. to impound 60 million more gals., water for city. Jerome Schneider, City Hall, city engr.

Pa., Aliquippa—Municipal Water Auth. of Center Twp., R.D. 3, Aliquippa, water supply sys., water lines, wells, pumps and storage, Center Twp. near here $500,000, Michael Baker, Jr., Inc., Baker Bldg., Rochester, engr.

▲ **Tenn., Knoxville**—City Bd. Utilities, 626 S. Gay St., water supply expansion for twenty year program, $2,500,000, first unit includes 4 m.g. reservoir on Buffet Mill Rd., $800,000.

▲ **Tex., Corpus Christi**—City, A. A. Lichenstein, mayor, City Hall, water filtration plant, 48 m. g. daily to include all allied structures for complete plant, brick and hollow tile walls, etc., Calallen. $4,000,000. Reagan & McCaughan, Wilson Bldg., consult. engrs. CD 11/30.

Tex., Houston—Almeda Plaza Development Corp., c/o B. Waidhofer, 1612 E. Alabama St., Sect. 1 Development, water lines, $37,000; Sect. 2 Development, water lines, facilities, $40,000, off Almeda Rd. R. L. Phillips, 1612 E. Alabama St., consult. engr.

Tex., Lufkin—Nacogdoches-Angelina and Nacogdoches Counties Water Control & Imprvt. Dist. No. 1, Lufkin, creation of water reservoir at Lake Ponta as a water supply expansion, $450,000; water pumping unit, $90,000 foregoing Lufkin-Nacogdoches; laying water main from reservoir to city limits, Nacogdoches, $175,000; laying water main from reservoir to city limits, Lufkin, $200,000.

Tex., Rockport—City, Seth Steele, mayor, bond election Mar. 30, Job. 2, WW sys. rehabilitation, $40,000; Job 3, c.i. water lines, $60,000.

SEWERS, WASTE DISPOSAL

Mich., Hazel Park—City, sanitary sewer from Gardenia to 11 Mile Rd. to provide outlets for areas south and east, $125,000. Municipal Consultant Service, 22633 Stephenson St., Hazel Park, consult. engrs. CD 4/15/47.

Mich., Owosso—City, Mayor Charles Moore, City Hall, $170,000 bond election Apr. 5, storm sewers.

O., Columbus—Comrs. Franklin Co., Court House, storm sewer to drain Northern Lights shopping center, Clinton Twp., $181,000, H. G. Dill, 2607½ N. High St., consult. engr.; storm sewer in Marion Twp. near Parsons Ave. and Williams Rd., $187,400.

O., Salem—City, Dean B. Cranmer, mayor, imprvs. sewerage sys. Malcolm Pirnie Engineers, 25 W. 43 St. New York, N. Y., consult. engrs.

O., South Euclid—City, City Hall, 1349 Green Rd., cement block incinerator, Monticello Blvd. and Green Rd. $125,000. C. L. Todd, 2313 E. Main St., Richmond, Ind., consult. engr. CD 11/10/52.

Pa., South Williamsport (Williamsport P.O.)—South Williamsport Boro, intercepting sewers, force main and sewage lift station, $400,000. The Chester Engineers, 210 E. Park Way, Pittsburgh, engrs.

Tex., Bellaire—Meyerland Co., c/o Thomas A. Robinson, Jr., 510 Taft St., Houston, 1st Sect. sanitary sewers, $85,000; storm sewers, $75,000, near here. Thompson McCleary, 2017 W. Gray St., Houston, proj. archt. Hilton & Coulson, 3821 Fannin St., Houston, consult. engrs.

Tex., Bellaire—Rottersmann Builders, Inc., 3602 Old Spanish Trail, Houston, Sec. 2, sanitary sewer lines, $85,000; Sec. 3, storm sewers, $70,000. John G. Turney, 2502 S. MacGregor St., Houston, consult. engr. CD 3/3.

Tex., Bonham—City, voted bonds Feb. 23, No. 1, sewage disposal plant, $150,000; sanitary sewer lines, $60,000. CD 2/10.

Tex., Houston—Almeda Plaza Development Corp., c/o B. Waidhofer, 1612 E. Alabama St., Sect. 1 Development, sanitary sewers, $62,500, storm sewers, $60,000; Sect. 2 Development, sanitary sewers, $62,000; storm sewers, $66,500, off Almeda Rd.

Tex., Rockport—City, Seth Steele, mayor, bond election Mar. 30, Job. 1, sanitary sewerage sys. rehabilitation, $60,000; Job. 4, sanitary sewer collection lines, $70,000.

Tex., Texas City—Town, sewage disposal plant imprvs. $80,000; sewer interceptor lines, $101,000; storm sewers, $150,000. CD 7/26/51.

▲ **Wash., Tacoma**—City, City Hall, trunk storm sewers in Arlington, Fern Hill, South Tacoma, Sixth Ave. and Titlow Beach Districts. $5,000,000. D. E. Morris, city engr.

Wis., Menomonee Falls—Village, $240,000 bond election Apr. 6, sewage treatment plant. Ruekert & Mielke, 203 N. Grand Ave., Waukesha, consult. engrs. CD 3/18.

Wis., Port Washington—City, sewage treatment plant, $500,000. Jerry Donohue Eng. Co., 606 N. 8 St., Sheboygan, consult. engr.

BRIDGES

Ill., Cicero—Village, Village Hall, viaduct widening Cicero Ave. at 25 Place, $800,000. DeLeuw & Cather, 150 N. Wacker Dr., Chicago, Zone 6, consult. engrs. CD 11/19/52.

O., Canton—Comrs., Stark Com. Court House, Gambrinus Rd. Bridge, seven 103 ft. spans, $450,000; replacing 17 township bridges, each having average span of 50 ft. $220,000. Wade Shidler, c/o owner, co. engr. CD 8/3/44.

O., Warren—Comrs., Trumbull Co. Court House, replace 4 bridges, two in Duck Creek Rd. one in Hartford Twp. and one in Warren Twp. $200,000. Harry Dittmer, co. engr.

▲ **O., Youngstown**—City, Frank X. Kryzan, mayor, City Hall, Division St. Bridge, $900,000; Gibson St., Bridge, $165,000. Robert Schomer, 5341 Old Oxford Law, consult. engr. CD 1/20/54, 5/16/49.

Tex., Houston—City, City Hall, 900 Brazos St., plans by Golemon & Rolfe, 5100 Travis St., walkway across Buffalo Bayou to connect coliseum to parking areas, $155,000. Walter Moore, 2 Pinedale St., consult. engr.

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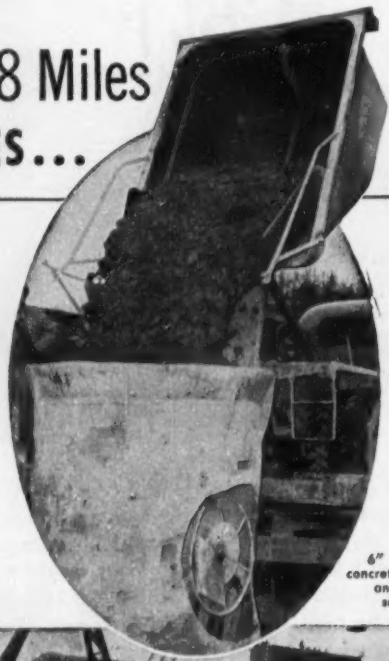

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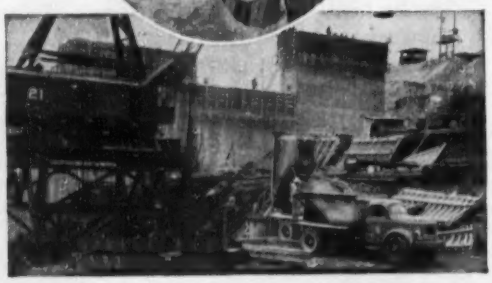

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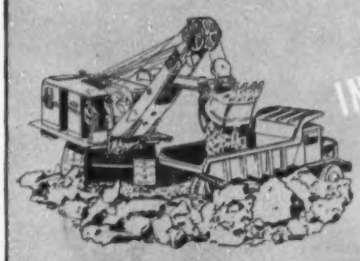

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WASHINGTON—State Hy. Comn., Transportation Bldg., Olympia.

Grays Harbor Co.—Bridge 9-C/26 over Humptulips River on Hy. 9-C, $295,100.

Snohomish Co.—overcrossing and interchange on Hy. 1 at Walnut St. in Everett, Broadway St. at Snohomish River bridge, $105,000.

Whatcom Co.—bridge over Nooksack River at Ferndale on Hy. No. 1, $556,000. W. A. Bugge, state hy. dir.

STREETS AND ROADS

Calif., Los Angeles—Los Angeles Co., Hall of Records, imprv. Jefferson Blvd. in Culver City. $140,000. S. R. Kennedy, c/o owner, engr.

Ia., Cedar Rapids—City, City Hall, paving. $672,500.

Minn., Adrian—Village, blacktopping various streets. $100,000. Kruse Eng. Service, Spencer, Ia., consult. engrs.

N. J., Cape May Court House—Bd. Freeholders, Cape May Co., Cape May Court House, 1/6 mi. Bay Shore Rd., F.A.S. S-188 (1), $120,000. Walter A. Keppler, co. engr. CD 12/27/44.

O., Canton—Comrs. Stark Co., Court House,
resurf. portions 118.5 mi. 39 county roads, $275,000.
Alliance-Maximo Rd., widen. and resurf. 4 mi. from Rte. 62 near Alliance to 1 mi. west of Maximo, $90,000.

Massillon-Orrville Rd., widen. and resurf. from Massillon to county line, $100,000.

Maximo-North Canton Rd., resurf., $30,000.

North Canton-Canal Fulton Rd., widen and resurf., from Marchand to Rte. 241, $60,000.

South Canton-Massillon Rd., widen. and resurf. 4⅓ mi. from Raff Rd. to Massillon city limits, $110,000.

West Vine St. and Marlboro Rd., widen. and resurf., $35,000. Wade Shidler, c/o owner, co. engr. CD 6/25/44.

O., Cuyahoga Falls—City, widen Portage Trail from State Rd. to 13th St., rebuild 14th St.-Portage Trail intersection, landscape around water storage tank. $162,890. Beiswenger & Hoch, 1661 W. Market St., Akron, consult. engrs. CD 11/13.

▲ **O., Youngstown**—City, Frank X. Kryzan, mayor, City Hall, and State Hy. Dpt., Columbus, widen and realign East Rayen Ave., Walnut St. to Oak St. Bridge, $140,000; Trygve Hoff & Assocs., 4500 Euclid Ave., Cleveland, consult. engrs.; relocate West Federal St. from near St. Ann's Church to Robinwood Ave., $1,320,000, Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago, Ill., and Anthony S. Aurilio, 97 Meadowbrook Ave., consult. engrs. CD 11/6.

Tex., Bellaire—Meyerland Co., c/o Thomas A. Robinson, Jr. 510 Taft St., Houston, 1st Sect., street constr., hard type paving, curbs and gutters, in 1,160 acre tract, tract adjoins Bellaire to the south. $100,000. Thompson McCleary, 2017 W. Gray St., Houston, proj. archt. Hilton & Coulson, 3821 Fannin St., Houston, consult. engrs.

▲ **Tex., Falfurrias**—Brooks Co., Falfurrias, bond election Mar. 27, rebuilding and macadamizing, Precinct 1, 19 mi. county roads, $300,000; Precinct 2, 22 mi. county roads, $328,000; Precinct 3, 17 mi. county roads, $272,150; Precinct 4, 15½ mi. county roads, $249,850.

Tex., Houston—Syndicate, c/o Cullen & Assocs., City Natl. Bank Bldg., hard paved parking area for packing plant zone, 100-acre Industrial tract. $150,000.

Tex., Houston—Almeda Plaza Development Corp., c/o B. Waidhofer, 1612 E. Alabama St., Sect. 1 Development, constr. new streets and asph. paving, $65,000; Sect. 2 Development, street constr. and asph. paving, $60,000, off Almeda Rd. R. L. Phillips, 1612 E. Alabama St., consult. engr.

Tex., Texas City—Town, street paving. $150,000.

▲ **WASHINGTON**—State Hy. Comn., Transportation Bldg., Olympia,

1954-55 PROGRAM

Chelan Co.—grading, surf., bit. and bridge on 2 mi. Hy. No. 10, Rock Island south, $173,000.
grading, surf., bit. and bridges, 1.9 mi. Hy. No. 10 Entiat vicinity, $414,000.
grading, surf., bit. 2.5 mi. Hy. 10, Lakeside west, $169,000.

Clark Co.—retop existing b. conc. 0.49 mi. and paving exceptions with c. conc. Hy. No. 1, Kalmaa River to Allen St. $42,900.
grading, surf. paving, bridges on 2.82 mi. Hy. 8, Fishers to Camas, $810,000.
grading, surf., paving 0.5 mi. Hy. 8-A, W. Reserve St. in Vancouver, $138,200.

Columbia Co.—wid'n., surf., paving 4 mi. Hy. 3 Casey Ditch to Dumas, $196,000.

Cowlitz Co.—embankment protection on 2.05 mi. Hy. 12, Nassa Point to Stella, $119,200.
pavement wid'n. Hy. 12 in Longview, east city limits to 30 Ave. 2 mi. $330,800.
grading, surf., paving 1.63 mi. Hy. 12, east approach Cowlitz River Bridge to Junction Hy. 1, $200,000.
grading, surf., paving Hy. 5-K, 11.5 mi. easterly from junction with Highway 1, $464,300.
grading, surf., paving frontage roads 4.4 mi. Longview Wye to Rocky Point, $335,000.

Douglas Co.—grading, surf., bit. 6.7 mi. Hy. No. 2 Moses Coulee to Baird, $276,000.

Grant Co.—b. conc. 10 mi. Hy. 7, Burke junction to Quincy, $93,000.

Grays Harbor Co.—b. conc. resurf. 7 mi. Hy. 9, Mud Bay Junction to Elma, $148,000.
grading, surf., paving Hy. 9 10.8 mi. Elma to Montesano, $211,000.
grading, surf., paving 4.8 mi. Hy. 9, Indiana Creek to Elwha River, $510,000.
grading, surf., paving 3.7 mi. Hy. 13, Moe Creek north, $587,500.

King Co.—grading, surf., paving Hy. 2 North Bend to Tanner, 3.8 mi. $575,000.
c. conc. paving 9.1 mi. Hy. 2, Middle Crossing on Snoqualmie River to Olallie Creek, $510,000.
paving Hy. 2, Lake Sammamish to Issaquah, 3.82 mi., $513,000.
grading, surf., paving, Hy. 15-B, Snohomish Co. line to Syomish River 5 mi., $430,000.

Kitsap Co.—grading, surf., paving 6.7 mi. Hy. 14 Purdy north, $1,005,000.

Lewis Co.—grading, surf., paving 6.61 mi. Hy. 12-E Winlock to Napavine, $210,000.
surf., paving, illuminate Hy. 1, Foster Creek to Frost Rd. 6.9 mi., $1,380,000.
surf., paving and illuminate Hy. 1, Frost Rd. to Avery Rd. 3.5 mi., $695,000.
surf., paving, illuminate 2.7 mi. Hy. 1, Borst Park to Thurston Co. line, $485,000.
bit. non-skid single seal shoulders on 76 mi. Hy. 1 Salmon Creek to Thurston Co. line, $460,000.

Pacific Co.—grading, surf., paving 1 mi. Hy. 12, South Bend end of pavement to west city limits, $128,700.
grading, surf., paving 10.6 mi. Hy. 12, west city limits South Bend to Palix River, $465,000.
grading, surf. Hy. 13-A, Raymond Airport Rd. to Fredrickson 2 mi. $165,900.

Skagit Co.—grading Hy. 1 from GN overcrossing in Mt. Vernon 4.45 mi. to junction north of Burlington, $799,000.
grading, surf. Hy. 170A, Rockport Hill vicinity 3.86 mi., $436,000.
paving, channelizing and illuminate Hy. 1, 4.28 mi., Conway to Blackburn St. in Mt. Vernon, $305,000.

Skamania Co.—grading, surf. paving 1.4 mi. Hy. 8, Wind River to Wind Mt., $128,700.

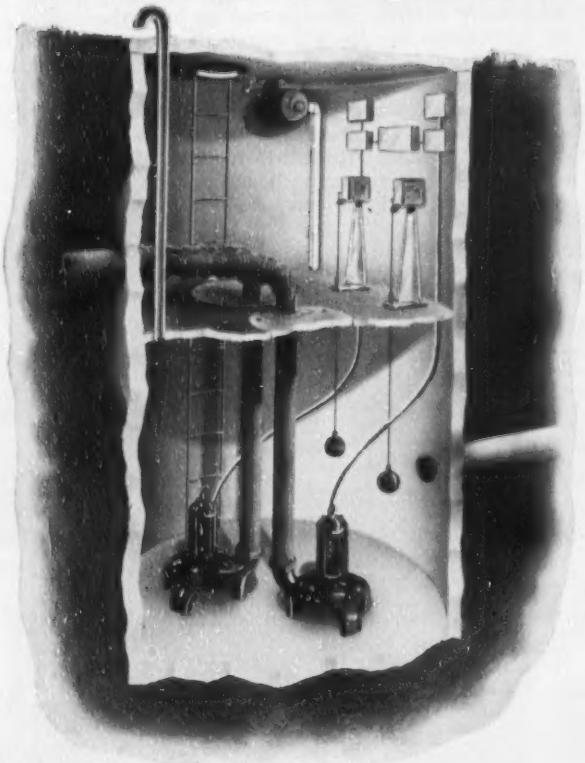
Snohomish Co.—b. conc. resurf. 4.35 mi. Hy. 15, Calavero's Corner to Snohomish, $100,000.

Spokane Co.—grading, surf., paving bridge, traffic signals on 5 mi. Hy. 2, Spokane to Greenacres Sect. 1, Spokane to Pines Rd., $1,400,000.
paving Hy. 3, Dartford vicinity 5.6 mi. $100,000.
paving 2 mi. Hy. 3, Deer Park vicinity, $50,500.
paving 2.9 mi. Hy. 3, Dragoon Creek to Denison, $60,500.

Thurston Co.—surf., paving 15.19 mi. Hy. 8, county line northerly, $128,000.

Wahkiakum Co.—grading, surf., paving 2.24 mi. Hy. 12, K. M. Mountain west, $557,700.
grading, surf. paving, bridge 4 mi. Hy. 12, Cathlamet west, $637,200.

The SUBMERSIBLE SEWAGE EJECTOR



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UNDERGROUND LIFT STATIONS

The **weil** NON-CLOG Screenless Submersible Sewage Ejector with the BLADELESS impeller will pump ALL sewage — household sewage, industrial sewage — even rags.

Capacities 35 to 300 GPM with heads to 45 feet.
Discharge: 3" and 4"; ½ H.P. to 3 H.P. Motors.

Illustration shows economical installation which does not require a PUMP HOUSE to mar the landscape. This reduces the overall cost of the Lift Station.

Send for NEW *Bulletin*

NEW Bulletin SE 680 B with plans and specifications for lift station installations as well as other applications will be sent upon request.

weil PUMP COMPANY
1528 NORTH FREMONT STREET • CHICAGO, ILLINOIS

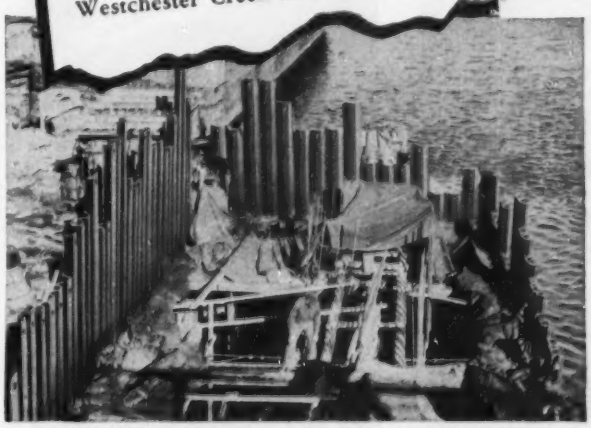
"The BIG SAVING was FOSTER RENTAL PILING"

On complicated 3-sided cofferdam for the $5 million East Bronx Unionport Bridge Construction.

Says John Ury, Project Manager for Contractors:

WM. M. MOORE BUILDING CORP.
and
LOPIER CONSTRUCTION CORP.
75 West 190th Street
Bronx, New York

Construction started in 1949, and skillful driving of 30 to 45 ft. Interlocking Steel Sheet Piling by these 2 contractors made this an economical, successful job. Unionport Bridge crosses Westchester Creek in East Bronx.



Rental Piling had to be driven considerably below the bed of the creek, with extra reinforcing to protect against swells.

An interesting installation of piers had to be constructed atop 35-year old existing caissons. Here was a tough water seepage problem in a complicated 3-sided cofferdam — approximately 1,000 gpm had to be pumped out of the cofferdam by two 6-inch pumps. Steel Sheet piling was needed — on time — in the exact section and lengths (30 to 45 feet). And Foster had it — just what the job required. A phoned order — a prompt delivery, a dependable quality — and a low cost, requiring no huge purchase investment on the part of the contractor, made FOSTER RENTAL PILING the 100% answer for this job.

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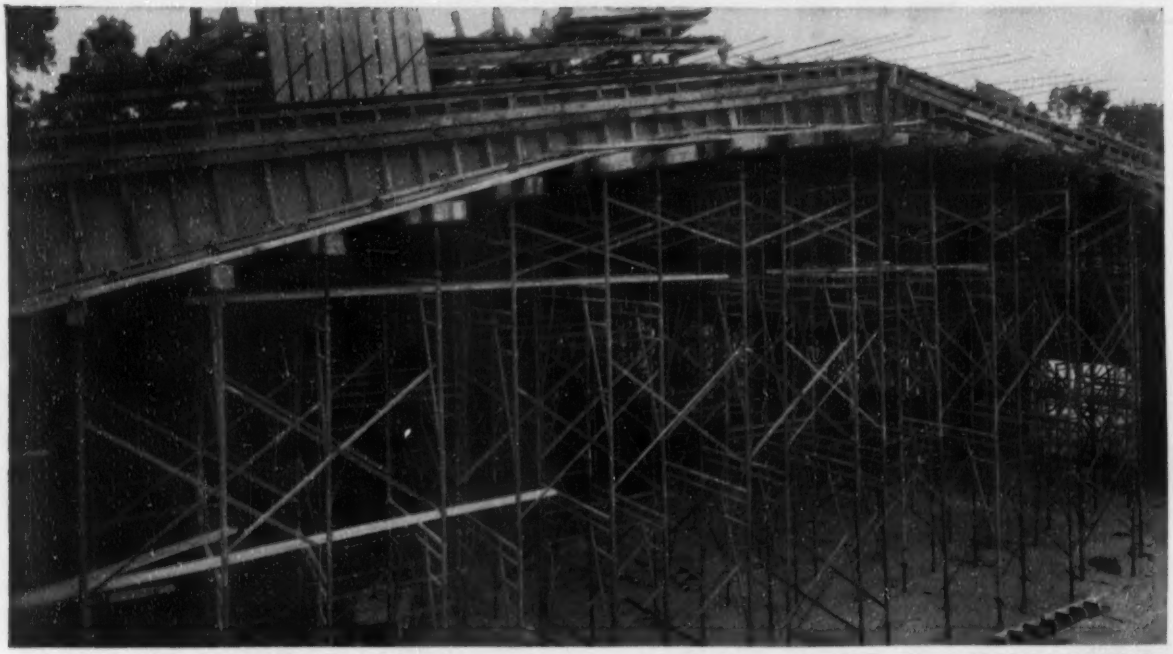


"TROUBLE SAVER"® SECTIONAL STEEL SHORING saves time and money on Mess Hall at Marine Corps Base, El Toro, Calif. Frame load at the heaviest point under the high-arched beam was 1,700 lbs. per lineal ft. "Trouble Saver" frames were spaced on 2'6" centers. Allison Honer Company was the general contractor.

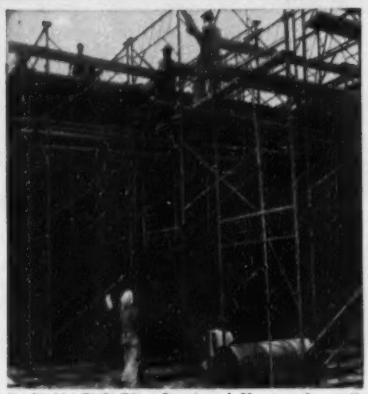
Prefabricated Steel Shoring Uses Scaffolding Frames, Braces

THERE'S A NEW WAY to cut concrete shoring costs—as proved by three alert contractors who used "Trouble Saver"® Sectional Steel Scaffolding for prefabricated shoring on recent construction projects.

One of the largest jobs to employ prefabricated scaffolding for shoring is a 4-story warehouse for Colgate-Palmolive-Peet Co. Requiring 6,300 5'-wide "Trouble Saver" frames, it also used 300 24" "Trouble Saver" Ladder Scaffolds on 7' spacing for spandrels. This shoring was designed so that it could be rolled from one location to another.

On an average-size job, "Trouble Saver" Shoring saved time and money at the Marine Corps Base, El Toro, Calif. Patent Scaffolding Co. supplied 989 6'6"-high by 5'-wide frames and 1,450 adjustable extension legs. On a smaller project, costs were cut by using "Trouble Saver" Shoring to build new cabanas for Miami's Blue Horizon Hotel.

Using "Trouble Saver" Scaffolding as shoring cuts erection costs—speeds job—no timber to saw or fit; safe—stresses are figured accurately; adaptable to large or small jobs; accurate sizes stop guess-work; cleaner, neater than wood; steel reduces fire hazard. Distributed by PS Co., "Trouble Saver" Shoring is described in free Bulletin PSS-28.



EASILY LEVELED—Sectional Shoring for 10"-12" floor slab of new Colgate-Palmolive-Peet warehouse at Jersey City, N. J., is accurately leveled by workmen on the ground. They are making adjustments on extension screw legs; no wedging or jacking necessary.

PLYWOOD PANELS are laid on I-beams without fastening of any kind during construction of cabanas at Blue Horizon Hotel, Miami. 144 5-ft and 6½-ft high "Trouble Saver" frames were used for shoring.

To help you solve any scaffolding problem, PS offers a complete nation-wide engineering service—available locally. See the Yellow Pages in your 'phone book for the nearest Patent Scaffolding office or representative handling "Gold Medal" Scaffolds.

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Yakima Co.—wid'n. Hy. 3 in Yakima on No. 1 St. North Ave. to B. St. 0.7 mi. $152,500.
grading, surf., paving Hy. 3, Parker bridge to Sunnyside dam, 1.2 mi. $155,000.
constr. third lane on Hy. 7, Alkali Ike's to Rock Canyon, 2.4 mi., $122,000.
grading, surf. paving, bridges 7.3 mi. Hy. 3A, Alfalfa to Satus, $490,000.
grading, surf., paving 2.5 mi. Hy. 11-A, Birchfield r. to Moxee, $220,000.
East-West Wahluke Slope Hy. 11-A, $125,000. W. A. Bugge, state hy. dir.
Wash., Seattle—City, County-City Bldg., Zone 4, paving streets in Magnolia and North Queen Anne Districts, $275,631. W. E. Parker, city engr.

EARTHWORK, WATERWAYS

Calif., Los Angeles—Los Angeles County Flood Control District, 2250 Alcazar St., 2 debris basins in Sierra Madre Foothills, Sierra Madre, Los Angeles Co. $175,000. H. E. Hedger, c/o owner, engr. CD 2/12/47.
Mich., Holland—City, Clarence Grevengood, clk., lengthening, dredging incl. turning basin, Lakce Macatawa Channel, etc. $185,000.

AIRPORTS

▲† Calif., Muroc—TEST FACILITIES—U. S. Eng., 751 S. Figueroa St., Los Angeles, hydrodynamics test facilities, Edwards Air Force Base. $1,116,000. Aerojet-General Corp., 6352 N. Irwindale Ave., Azusa, consult. engrs. CD 12/10/52.
† Va., Dam Neck—TRANSMITTER FACILITY BLDG.—P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, plans by Clark, Buhr & Nexsen, 2008 Midtown Bldg., Norfolk, rein.-con. transmitter facility bldg. $600,000. CD 9/4/52.
▲† Wash., Moses Lake—HANGARS, etc.—Boeing Airplane Co., 7755 E. Marginal Way, Seattle, Zone 4, plans by Naramore, Bain, Brady & Johanson, 904 7 Ave., Seattle, hangars, flight aprons, etc. for center to house B-52 jet bombers, for U. S. Air Force, Pentagon, Wash., D. C., $10,000,000. CD 2/18.
▲† Wis., Milwaukee—HANGAR, etc.—U. S. Eng., 428 Federal Bldg., hangar for Air National Guard at General Mitchell Field, $3,000,000; runway, grading, taxiway for Air National Guard at General Mitchell Field, $1,100,000.

PUBLIC BUILDINGS

Calif., Lemon Grove—SCHOOL—Lemon Grove School District of San Diego Co., Lemon Grove, voted $550,000 bonds, schools. CD 12/11.
▲ Calif., Riverside—SCHOOLS—Riverside City School District, 3954 12 St., $5,000,000 bond election Apr. 27, Senior High School, $3,200,000, elementary schools, $1,800,000. CD 12/30.
▲ Calif., Taft—SCHOOL—Taft City School District, Taft, voted $1,400,000 bonds, Feb. 16, Roosevelt Taft Primary and Taft Heights Schools. CD 1/5.
Conn., Goshen, Warren and Morris—SCHOOL—Regional High School District No. 6, Roger Lyman, chn. School Building Comn., Goshen, plans by Nichols & Butterfield, 998 Farmington Ave., West Hartford, and Marchant & Minges 967 Farmington Ave., West Hartford, brick, steel, concrete, Regional High School Barney Hill, Noth of Rte. 25, $560,000.
Ia., Fairfield—SCHOOL—Bd. Educ., Fairfield, grade and junior high school. $600,000.
▲ Kan., Coffeyville—LIGHT PLANT—City, light plant expansion, $3,300,000, Lutz & May, Finance Bldg., Kansas City, Mo., consult. engrs.
Kan., Eureka—HOSPITAL—Greenwood Co., voted $525,000 bonds Feb. 16, hospital.
▲ Mich., Detroit—LIBRARY—City, Ralph A. Ulveling, dir. Detroit Public Library, 5201 Woodward St., two 87x187 ft. wings, 3,530,000 cu. ft. addn. to Detroit Public Library, alterations, Woodward and Kirby Sts. $9,500,000, George R. Thompson, Guardian Bldg., city engr. CD 3/30/43.
▲ Mich., East Grand Rapids—SCHOOL—City, Louis F. Battles, clk., voted $1,250,000 bonds, schools. J. & G. Daverman, 924 Grandville St. S.W., Grand Rapids, archts. CD 1/4.
▲ Mich., East Lansing—SCHOOL—City, C. E. MacDonald, supt. Schools, 810 Forest St., voted $1,850,000 bonds Feb. 23, 105,000 sq. ft. high school, Warren S. Holmes Co., 2200 Olds Bldg., Lansing, archts. CD 2/11.
▲ Mich., Grand Rapids—HOME FURNITURE DISPLAY PROJECT—City, Mayor Paul G. Goebel, City Hall, 50-home furniture village display proj. $1,000,000.
Mich., Grandville—SCHOOL—Bd. Educ., Grandville School Dist., voted $650,000 bonds Oct. 27, brick East Elementary School addn., high school addn., James K. Haveman & Sons, 735 Michigan Bldg., Grand Rapids, archts. CD 10/23.
▲ Mich., Rochester—SCHOOL—City, Bd. Educ., Rochester School Dist., voted $1,800,000 bonds Feb. 24, high school, $900,000, elementary school, $300,000, 11 other elementary school rooms addn. to 2 schools, H. E. Beyster & Assoc., 2000 Industrial Bank Bldg., Detroit, archts. CD 2/9.

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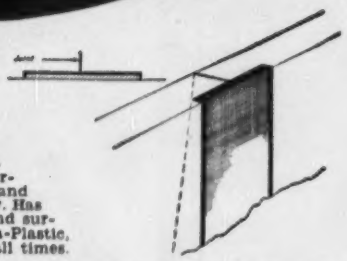

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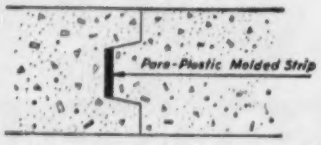

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▲ **Mont., Bozeman**—DORMITORIES—Montana State Bd. Educ., Helena, men's dormitory, $1,250,000; women's dormitory, $1,300,000; student union bldg. addn., $750,000. CD 9/13/45.

▲ **O., Boardman**—SCHOOL—Bd. Educ., Boardman Twp. School Dist., Market St., plans by Kling & Frost, 661 Wick Ave., Youngstown, grade school, $600,000; remodel high school, $600,000. CD 11/10.

▲ **O., Oxford**—ADMINISTRATION, etc.—Miami University, Dr. John D. Millett, pres., Oxford, admin. bldg., $900,000; university center, E. Spring and Patterson Ave., $1,500,000. CD 7/25/50.

O., Piketon—SCHOOL—Piketon School Dist., Piketon, bond election Nov. 2, elementary school and renovating existing high school. $840,000. CD 12/30.

O., Washington Court House—SCHOOL, City, Washington Court House, defeated bonds Feb. 9, school building program. $735,000. CD 12/29.

▲ **O., Wooster**—SCHOOLS—Bd. Educ., Wooster, grade school, $630,000; high school gym and shop bldg., $510,000.

O., Youngstown—FIRE STATION—City, Frank X. Kryzan, mayor, City Hall, plans by Arsene Rousseau, Mahoning Bank Bldg., fire station at undetermined downtown site. $600,000. CD 11/6.

▲ **Tex., Houston**—HIGH SCHOOL—Houston Independent School Dist. 1600 Washington St., plans by Stayton Nunn, archt., 3272 Westheimer St., and Milton McGinty, superv. archt., 2425 Ralph St., 135,000 sq. ft., steel, brick Junior High School addn., swimming pool, etc. in Zindler St. in Denver Harbor addn. $1,700,000. CD 12/1/52.

Tex., Vidor—HIGH SCHOOL—Vidor Independent School Dist. Vidor, bond election Feb. 9 cancelled, new date soon, high school. $750,000. W. B. Livesay & Sons, Box 2228, Beaumont, archts. CD 1/22.

▲ **Wash., Yakima**—SCHOOL—School Bd., Yakima, bond election Nov. 9, high school, $1,500,000. CD 12/10.

▲ **Wash., Yakima**—SCHOOL—School District No. 7, Yakima, election Nov. 9 on special levy to complete financing Junior High School $1,000,000. J. W. Maloney & J. M. Whitney, Larson Bldg., archts. CD 11/17/52.

▲ **Man., Winnipeg**—BUILDINGS, etc.—Defence Constr. (1951) Ltd., Kensington Bldg., 20 buildings, barrack blocks, stores, canteens, chapel of permanent construction for Fort Osborne Barracks, $5,000,000. K. F. Hurst, c/o owner, regional engr. CD 12/7.

▲ **Ont., Oakville**—HOSPITAL—Oakville-Trafalgar Memorial Hospital Bd., Oakville, plans by Govan, Ferguson, Lindsay, Kaminker, Langley & Keenleyside, 515 Jarvis St., Toronto, 3 story, bsmnt., 95-bed, hospital extension and new power house, $1,500,000.

COMMERCIAL BUILDINGS

▲ **Calif., Anaheim**—DWELLINGS—Broadway-Santa Ana Co., 327 S. Placentia Ave., Anaheim, 148 frame DWELLINGS, in Bonded Homes Unit IV, $1,000,000.

▲ **Calif., Ontario**—DWELLINGS—Tobin Co., 3574 Santa Monica Blvd., Los Angeles, plans by Marvin C. Johnson, 5159 Cahuenga Blvd., North Hollywood, Calif. 144 frame, stucco dwellings. $1,000,000.

Calif., Rialto—DWELLINGS—James Bayens, 16032 Valley Vista Blvd., Encino, 87 frame stucco dwellings. $750,000. Reichl & Starkman, 251 S. Robertson Blvd., Beverly Hills, consult. engrs. CD 2/16.

▲ **D. C., Wash.**—HOSPITAL—Casualty Hospital, 708 Massachusetts Ave. N.E., plans by Irwin S. Porter & Sons, Metropolitan Bank Bldg., hospital annex, $1,500,000.

Ind., Marion—SCHOOL—St. Paul's Catholic Church, Marion, school-high school and gymnasium, on Ind. 37 By-Pass, northwest of here. $600,000.

Md., Hagerstown—SCHOOL—St. Mary's Catholic Church, Hagerstown, plans by Border & Donaldson, 2517 St. Paul St., Baltimore, 2 and 3 story, brick, stone, steel, concrete high school, $500,000.

Mass., Weston—LIBRARY—Regis College, 235 Wellesley St., plans by Charles F. Wright, 621 Main St., Waltham, 3 story, brick, concrete frame library, $500,000.

▲ **Mich., Lincoln Park**—STORE—Sears Roebuck & Co., 15001 Woodward St., Detroit, brick, steel suburban store, 30 acre site. $2,000,000.

▲ **Mich., St. Joseph** — ADMINISTRATION — Whirlpool Corp., D. W. Alexander, vice pres., St. Joseph, brick, steel admin. bldg., North Shore Dr. $1,300,000.

Minn., St. Paul—HOTEL—St. Paul Theaters Co. (subsidiary RKO Theater Corp.), St. Francis Hotel, plans by Liebenberg & Kaplan, 51 S. 13 St., Minneapolis, modernizing St. Francis Hotel, West 7 St. between Wabasha and St. Peter Sts. $500,000.

▲ **N. J., Verona**—APARTMENTS, etc.—Montclair Skytop Co., c/o Frank Grad & Sons, archts., 11 Commerce St., Newark, three 16 story apartments and shopping center, on 47-acre tract in Pompton Ave. to be called Skytop Park, $6,500,000.

▲ **N. Y., Flushing**—HOSPITAL, etc.—Salvation Army, Inc., 120 W. 14 St., New York, Zone 11, plans by William Schorn, 501 Madison Ave., New York, Zone 22, 8 story hospital and convalescent home, Main St. and North Hempstead Turnpike. $2,000,000. CD 5/1/52.

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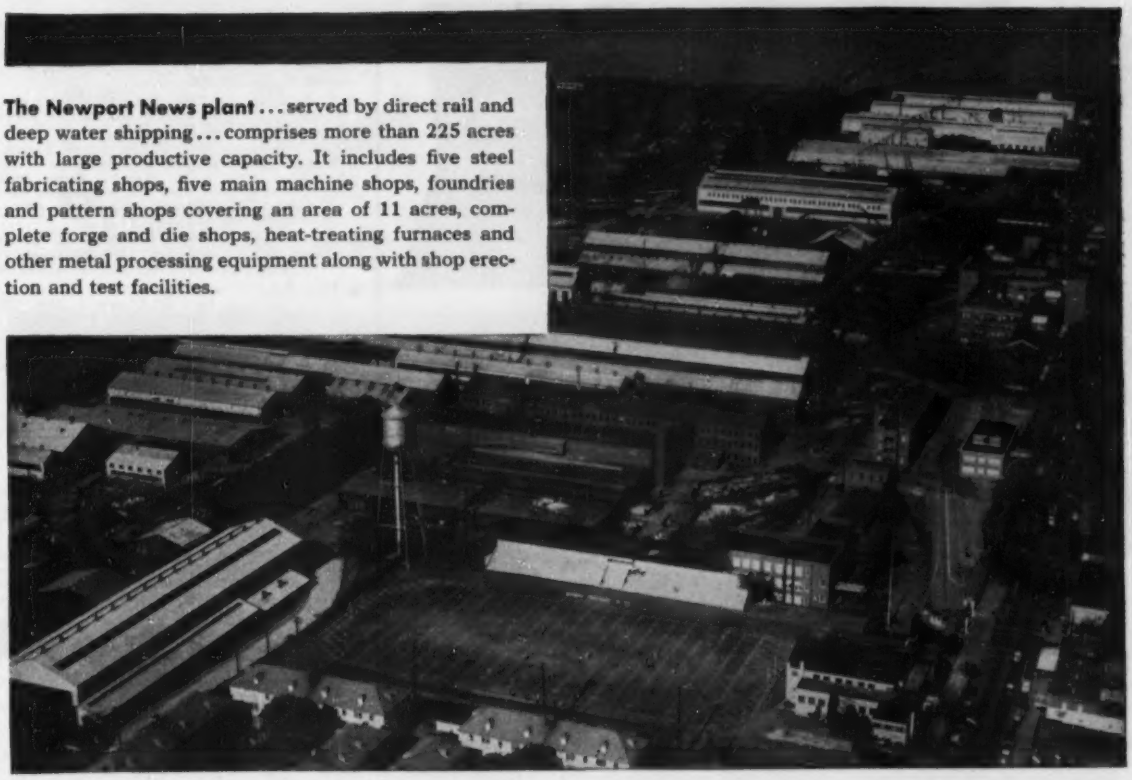

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▲ **N. Y., Jamaica** — APARTMENT — Kalikow Constr. Corp., 16 Court St., Brooklyn, Zone 2, plans by Morris Rothstein & Son, 186 Joralemon St., Brooklyn, Zone 2, 6 story apartment, Pershing Crescent, west of Lander St. $1,330,000.

▲ **O., Columbus**—HOUSING—Associated Builders of Columbus, Inc., 1789 N. Fourth St., 128-unit low-rent housing. $1,000,000.

Tex., Arlington-Grand Prairie—STORE—Sears, Roebuck & Co., 5334 Ross St., Dallas, plans by George L. Dahl, archt.-engr., 2101 N. St. Paul St., Dallas, 55,000 sq. ft. masonry retail store, incl. reserve stock rooms, offices, on Dallas-Fort Worth Hy., between Arlington and Grand Prairie. $500,000.

▲ **Tex., Houston**—SHOPPING CENTER—Wm. G. Farrington, 1661 Tanglewood St., shopping center, 4½ acre tract Westheimer and Post Oak Sts. $2,500,000.

▲ **Tex., Pasadena** — HOTEL — John P. Pachlhofer & Assocs., Pasadena, plans by Golemon & Rolfe, 5100 Travis St., Houston, 8-story hotel. $1,000,000. CD 3/1.

▲ **Tex., Victoria**—SHOPPING CENTER—Town & Country Shopping Center, Victoria, plans by Melvin Cates, Box 241, Tyler, shopping center. $1,750,000. Lockwood & Andrews, 103 Liberty St., consult. engrs.

Va., Norfolk—APARTMENT UNITS—Universal Eng. Corp., c/o Arthur Konikoff, 604 Court St., Portsmouth, plans by Arthur Konikoff, 604 Court St., twenty-nine 1 story masonry, frame 116-apartment units, near here. $750,000.

▲ **Ont., Ottawa**—FACULTY OF ARTS—University of Ottawa, Laurier Ave. E., plans by Jean Serge Le Fort, 86 Greenfield St., faculty of arts bldg., Waller St. south of Laurier Ave. E. $1,000,000.

▲ **Que., Hull**—HOUSING—L'Habitation Laurier Ltd., 189 Principal St., 120-family low-rent housing, incl. 22 buildings in northern section of city $1,000,000. Edgar Dressault, 189 Principal St., c/o owner, engr.

INDUSTRIAL BUILDINGS

▲ **Calif., Los Angeles**—WAREHOUSE, etc.—Broadway-Hall Stores, Inc., 4 and Broadway, plans by Chaix & Johnson, 2504 W. 7 St., 2 story, concrete warehouse and service bldg., N. Soto St. $1,000,000. Brandow & Johnson, 501 S. Boyiston St., consult. engrs.

▲ **Ind., Indianapolis**—MILL REMODELING, etc.—Heppenstall Co., R. B. Heppenstall, pres., 4624 Hatfield St., Pittsburgh, 1, Pa., remodeling, revamping steel mills. $1,000,000.

▲ **Miss., Gulfport**—GENERATING PLANT—Mississippi Power Co., Hancock Bank Bldg., Gulfport, 100,000 kw. generating plant, near here. $15,000,000.

▲ **Mo., Kansas City**—PLANT—General Motors Co., Chevrolet and Fisher Div., Leeds Station, Kansas City, Mo., enlarging assembly plant 176,000 sq. ft., new generator and pumphouses, etc. $2,000,000.

▲ **Neb., Beatrice** — STEAM GENERATING PLANT—Nebraska Public Power System, 2416 14th St., Columbus, steam generating plant, $17,600,000. R. W. Beck & Assoc., Columbus, assoc. engrs.

▲ **Pa., Wind Gap**—OIL STORAGE FACILITY—Esso Standard Oil Co., 21 S. 12 St., Phila., converting a quarry into a fuel oil storage facility. $1,000,000. G. Edwin Pidcock Co., B & B Bldg., Allentown, consult. engr. Kenneth O. Johnson, c/o owner, engr.

▲ **Tex., Houston**—PLANT—Syndicate, c/o Cullen & Assocs., City Natl. Bank Bldg., slaughtering and meat packing plant, 100-acre Industrial tract. $2,750,000.

▲ **Va., Roanoke**—PLANT—General Electric Co., River Rd., Schenectady, N. Y., 2 story, approx. 200x575 ft. and 500x840 ft. plant. $10,000,000. Carl A. Salmonsen, genl. mgr., Industrial Control Dpt., c/o owner, engr.

▲ **W. Va., Ward**—PLANT—Valley Camp Coal Co., Ward, coal preparation plant with facilities for loading on Kanawha River and N.Y.C. R.R. as well as storage, $3,000,000. Robert Bradford, c/o owner, engr.

▲ **Que., Chicoutimi**—SMELTER and REFINERY—Eastern Smelting & Refining Co. Ltd., Chicoutimi, copper-nickel smelter and refinery, 25,000 hp. plant. $7,500,000-$10,000,000.

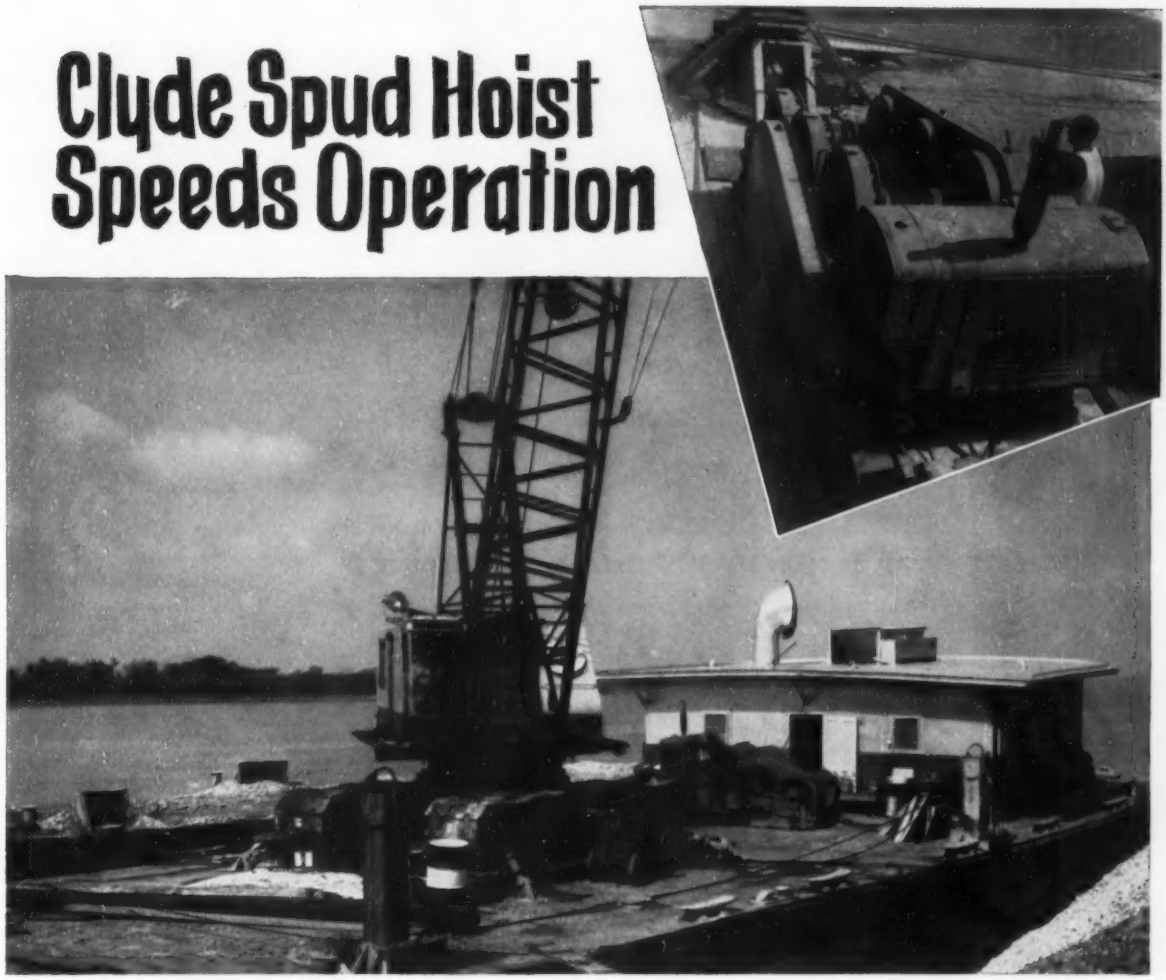
UNCLASSIFIED

▲ **Calif., San Francisco**—PLAYGROUNDS, etc.—San Francisco Recreation & Park Comn., City Hall, Angelo J. Rossi Playground, incl. swimming pool, $433,000; Aquatic Park Swimming Pool, $300,000; Upper Noe Playground, $455,000; North Beach Playground, $150,000; Hamilton Playground, $525,000; Margaret S. Hayward Playground, $310,000; Eureka Valley Playground, $452,000; central activities bldg., $352,000. CD 11/13/47.

North Carolina—TELEPHONE LINES—Heins Telephone Co., Sanford, 247 mi. new telephone lines, Lee Co. $509,000.

▲ **Texas**—LOOP LINES, etc.—El Paso Natural Gas Co., Bassett Tower, El Paso, laying 726 mi. main transmission loop lines, Reagan and Upton Counties, $9,600,000; 96 mi. main transmission line, Stiles area, Reagan Co. $960,000; compressor stations, McCamey, Upton Co. $345,000; Stiles area, Reagan Co., $460,000; Big Lake, Reagan Co., $275,000; Rankin area, Upton Co., $325,000. CD 2/19.

Clyde Spud Hoist Speeds Operation



for Jahncke Service, Inc., New Orleans

This Clyde Spud Hoist has what it takes to do a bang-up job for Jahncke Service, Inc. of New Orleans.

Extra powerful band friction clutches are easily engaged to lift the heavy spuds from their anchorage or to pull a loaded barge into place for unloading. Anti-friction bearings result in "free-wheeling" drums that pay out cable easily and allow the spuds to drop quickly. Ratchets are shrouded and gears are well enclosed to prevent possibility of rope entanglement. Pawls positively lock in and out to eliminate any chance of accidental load dropping.

Drums are easily removed . . . intermediate shaft can be removed without disturbing drums . . . friction bands can be replaced or adjusted without removing drums. Ball and roller bearings result in greater line pull with less power consumption.

Special consideration is also given to the hoist operator. A comfortable seat is provided with brake and clutch controls that operate so easily it's called "fatigue-free" operation.

Marine and Dredging Contractors find that Clyde Quality Plus Hoists offer many advantages for their particular type of service. Write today for further information.

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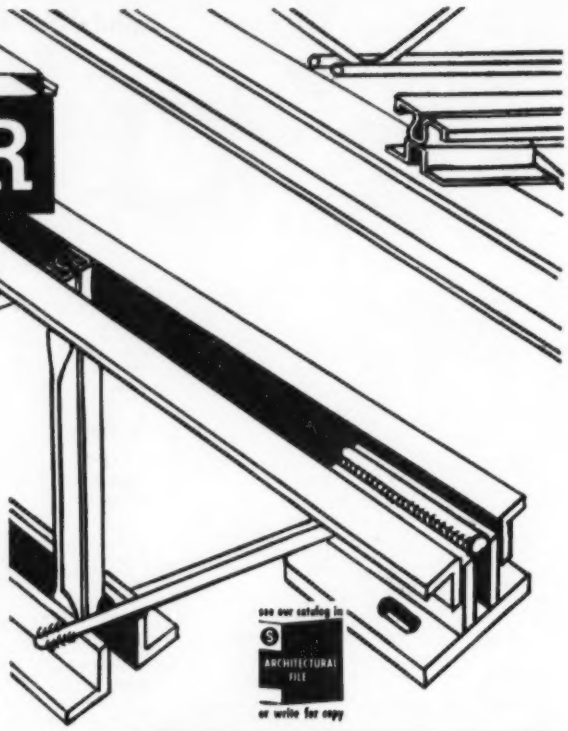

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Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 23 Massachusetts
STREETS AND ROADS
March 23 Massachusetts

▲† **Me., Bangor**—FACILITIES—B.A. On Or About 4/15—U. S. Eng., 857 Commonwealth Ave., Boston 15, Mass., Air National Guard facilities, incl. 203x212 ft. hangar, warehouse, motor service shop, paint, oil and dope bldg., steam distr. sys. piping, site imprvs. Dow Air Force Base, ENG-19-016-54-91. $1,000,000-$2,000,000. Plans deposit $25.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
After March 27 New Jersey
March 30 Maryland, New Jersey
April 1, 30 New York April 2 Pennsylvania
STREETS AND ROADS
March 23 Maryland March 30 New Jersey
April 1 New York

BIDS ASKED—BUILDINGS

▲† **N. Y., West Point**—LAUNDRY—B.A. 4/15—U. S. Eng., 80 Lafayette St., New York, Zone 13, laundry with dry cleaning plant and boiler room, Serial No. Eng-30-075-54-92. $1,600,000. Plans deposit $25. CD 11/15/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. 4 St., Harrisburg,
Lycoming Constr. Co., Inc., 127 Susquehanna St., Williamsport 19, Pa., LB **$2,110,622**, constr. 3.63 mi. Northeast Ext. of Pennsylvania Turnpike, Sec. 37-D, Kidder Twp., Carbon Co. Bids Mar. 9. CD 2/19.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Sam Verman**, 2211 Beechwood Blvd., Pittsburgh, Pa., CA Approx. **$1,000,000**. 1 story 160x465 ft. brick, block SHOPPING CENTER, Perry Hy., Ross Twp. PITTSBURGH, PA. Rossview, Inc., Standard Life Bldg., Pittsburgh, Pa. Hyman Rosenberg, 813 Berger Bldg., Pittsburgh, Pa. archt. CD 2/5/52.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 26 Tennessee
STREETS AND ROADS
March 26 Kentucky, Tennessee

▲ **Louisiana**—TUNNEL—B.A. About 4/28—State Hy. Dpt., Highway Office Bldg., Baton Rouge, Harvey Canal Tunnel under Harvey Canal on State Rte. No. 2200, S.P. 283-09-01, F.A. Proj. U 409 (3), Jefferson Parish. Plans deposit $100, Palmer & Baker, Inc., P.O. Box 346, Mobile, Ala., consult. engr. CD 9/30.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Tidewater Constr. Corp.**, 538 Front St., Norfolk, Va., LB **$667,400**, ammunition barge mooring facilities, Naval Base, NOY 74888, NORFOLK, VA. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va. Bids Mar. 9. CD 2/15.

BUILDINGS

LOW BIDS AND CONTRACT

† **Byrne Organizations, Inc.**, 117 W. 21 St., Norfolk, Va., LB **$673,500**, 3 story 600-man rein.-con., lift lab floor and roof sys. BARRACKS, U. S. Naval Amphibious Base, NOY 81538, LITTLE CREEK, VA. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va. Bids Mar. 9. CD 2/3.
Young Constr. Co., Rock Hill, S. C., CA **$628,755**, three SCHOOLS, ROCK HILL, S. C. Bd. Trustees, Rock Hill School Dist. 3, Rock Hill, S. C. Bids Feb. 25.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 23 Illinois March 24 Michigan
STREETS AND ROADS
March 23 Illinois March 23, 24 Michigan
March 30 Wisconsin

BIDS ASKED—BUILDINGS

▲ **Ill., Chicago**—PARKING GARAGE—B.A. 3/23—City, City Hall, Parking Garage Project No. 10, Grand and Fairbanks and Ohio and St. Clair Sts. $1,000,000. McClurg, Shoemaker & McClurg, 39 S. La Salle St., Zone 3, Ill., archts. CD 2/27.

▲ **Ill., Cicero**—SCHOOL—B.A. 4/2—School District 99, 5110 W. 24 St., Cicero, John Paul Jones Elementary School, 15 St. and 50 Ave. $1,000,000. A. J. Zelenka, 2311 S. Lombard St., archt. CD 12/4/52.

▲ **O., Columbus**—HOUSING—B.A. 4/22—U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va., construct, manage, finance, 500 frame, brick, stucco housing units in row-type bldgs. $5,000,000. Plans deposit $50. Inscho, Brand & Inscho, 60 E. Broad St., archts. CD 12/18.

▲ **O., Columbus**—FIELD HOUSE—B.A. 4/29—Ohio State University, N. High St., octagonal shaped, 2,350 sq. ft. field house with 14,000 capacity arena for basketball; unit in a group to include indoor baseball and football facilities and costing total of $6,000,000. $3,500,000. Howard Dwight Smith, 1950 Arlington Ave. OSU archt. CD 11/17/44.

Ill., Chicago—HOUSING—Blds Asked—Arthur Rubloff Co., 100 W. Monroe St., Zone 3, 64 unit, 10 building housing, Drexel Blvd. and 48 St. $800,000. **Bertrand Goldberg**, 721 N. Michigan St., archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **OHIO**—Ohio Turnpike Comn., 139 E. Gay St., Columbus,
Remington Rand, Inc., 315 Fourth Ave., New York, N. Y. LB **$2,884,223**, toll collection equipment for automatic classification of vehicles;
Taller & Cooper, Inc., 75 Front St., Brooklyn, N. Y., LB **$498,915**, non-classifying toll collection equipment for 241-mi. east-west Ohio Turnpike. Outright sale to Turnpike Comn. CD 7/8/52.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Steinle-Wolfe, Inc.**, 128 N. Jefferson St., Fremont, O. CA **$1,262,398**, general constr.,
Zindle Plumbing & Heating Co., 1055 S. Main St., Akron, O., CA **$301,628**, plumbing and heating for East HIGH SCHOOL, Brittain Rd. near E. Market, for 1,200 students, AKRON, O. Bd. Educ., 70 N. Broadway, Akron, O. Bids Feb. 4, awarded Feb. 15. CD 1/20.

▲ **Robert W. Setterlin & Sons Co.**, 1030 W. Third Ave., Columbus, O. CA general constr.;
Electrical Contractors, Inc., 2289 W. Broad St., Columbus, O. CA electric;
Huffman-Wolfe Co., 669 N. High St., Columbus, O. CA heating, plumbing and ventilating, total est., **$3,000,000**. $9,000,000 with equipment for 4-story 187x187 ft. two-bsmnts., rein.-con. brick long distance dial EQUIPMENT BLDG., Long and 4th Sts., COLUMBUS, O. Ohio Bell Telephone Co., 42 E. Gay St., Columbus, O. Bids Mar. 3. CD 2/11.

▲ **Kapel Realty Co.**, 21771 Miller Rd., Euclid, O. Own Forces. Approx. **$5,000,000**. 250 HOUSES and addnl. APARTMENT BLDG. development, 2500 Euclid Ave. EUCLID, O. Raymond A. Davies & Assoc., State St. Bldg., Painesville, O. engrs.-archts.

▲ **Ragnar Benson, Inc.**, 4744 W. Rice St., Chicago 51, Ill., CA, **$2,250,000**, 2 story, 180,000 sq. ft. WAREHOUSE OFFICE, railroad trackage, CHICAGO, ILL. Westinghouse Electric Co., 401 Liberty St., Pittsburgh, Pa. Bids Feb. 16, awarded Mar. 4. CD 2/3.

▲ **Campbell-Lowrie-Lautermilch**, 400 W. Madison Ave., Chicago, Ill., CA, **$1,200,000**, 150,000 sq. ft. WAREHOUSE, 95 St. and Stony Island Ave.; CA **$650,000** 92,000 sq. ft. WAREHOUSE, 95 St. and Stony Island Ave., CHICAGO, ILL. Calumet Industrial District Co., 11114 S. Western Ave., Chicago, Ill. Lunstrom & Skobic, 53 W. Jackson Blvd., Chicago 4, Ill., archts. Awarded Feb. 25.

▲ **Sorenson-Gross Constr. Co.**, Flint, Mich. CA **$3,530,000**. general contract;
Ben Agree Co., Flint, Mich. CA **$752,100**. mechanical contract;
General Electric Shop, Ann Arbor, Mich. CA **$612,790**. electric contract, for brick, steel, concrete high SCHOOL, ANN ARBOR, MICH. City, Bd. Educ., Ann Arbor, Mich. CD 2/4, under LB.

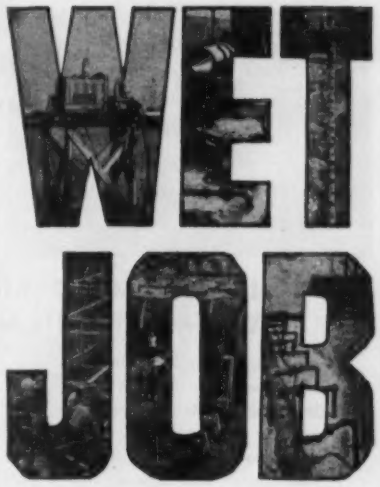
▲ **Garling Constr. Co.**, 6922 N. Telegraph Rd., Dearborn, Mich. Owner Builds. Est. **$7,000,000**. 600 HOMES on 320-acre development West Maple, Cranbrook, Lincoln and Lasher Sts., BIRMINGHAM, MICH.
Saul Katz, 1317 Lafayette Bldg., Detroit, Mich. Owner Builds. est. **$800,000**. 2 brick APARTMENTS incl. 90 units, Burns St., DETROIT, MICH.

▲ **Fuller Investment Co.**, David Fuller, Pres., 23081 Powell St., Hazel Park, Mich., Owner Builds. est. **$1,500,000** masonry SHOPPING CENTER incl. department store, super market, misc. stores, Eighth Mile and Dequindre Sts., HAZEL PARK, MICH.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 24 Missouri March 30 Kansas
STREETS AND ROADS
March 24 Missouri March 30 Kansas

IF IT'S A



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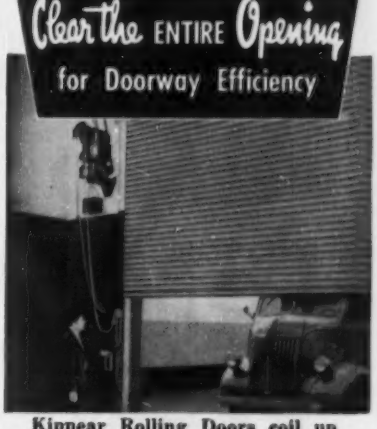

Kinnear Rolling Doors coil up and out of the way, clearing the entire opening, from jamb to jamb and floor to lintel! The rugged interlocking steel-slat curtain glides into instantaneous action with either manual or push-button control. Write now for all details.

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KINNEAR
ROLLING DOORS

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Climatic conditions had ruined the surface of this water storage reservoir at a Central Pennsylvania Institution. Cement Gun Company was called in to restore the structure with "Gunite." Photograph at left, above, shows our crew removing all of the disintegrated concrete prior to covering the wall with wire mesh. With reinforcing in place, "Gunite" was applied to bring the walls up to their original thickness (see photo above, right).

Complete information on many water storage reservoirs constructed or restored by Cement Gun Company are illustrated and described in our latest catalog, together with many other types of "Gunite" work we have done. A request, on your letterhead for catalog A2400 will bring your copy by return mail.

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LOCOMOTIVE CRANES
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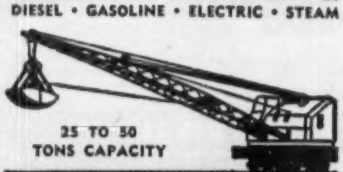

25 TO 50 TONS CAPACITY

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

▲ Tex., Houston—BANK, OFFICE, etc.—Bids Asked—Second National Bank of Houston, 800 Main St. (selected list of bidders), 25 story bank and office, $4,000,000; parking garage, $500,000. Kenneth Franzheim, 2402 Crawford St., archt. H. E. Bovay, Jr., M. Esperson Bldg., Reg. F. Taylor, Bankers Mortgage Bldg., and Ware Butterich, 2303 LaBranch St., engrs. CD 1/5.

SOON LETS CONTRACT—BUILDINGS

▲ Tex., Denison—HOUSING—Purch. & Contg. Officer of Perrin Air Force Base, Denison, soon lets contract construct, manage, finance 300 unit Wherry Housing Proj. $2,250,000. CD 11/18.

BUILDINGS

LOW BIDS AND CONTRACTS

C. T. Wilson, 10401 Tringate Place, Baden 5, Mo. CA Est. $869,136. one hundred and fifteen 1 story, frame RESIDENCES, Perthsire and Grampian Rds. and Spring Garden Lane, BADEN (ST. LOUIS 15 P. O.), MO. Wilson Homes, Inc., 10401 Tringate Pl., Baden 5, Mo. Paul Kligensmith & Assoc., 4232 W. Pine Blvd., St. Louis 8, Mo., archts.

▲ J. A. Crow & Co., 229 Lake Park Shopping Village, Dallas, Tex., Owner Builds. Approx. $2,500,000. Emerald Isle SHOPPING CENTER, DALLAS, TEX. CD 3/10.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES
March 31 California

STREETS AND ROADS
March 31 California

▲ Calif., Redondo Beach—B.A. 3/29—City, 122 Emerald St., sanitary sewer Phases II and III. $1,877,540. Koebig & Koebig, 3142 Wilshire Blvd., Los Angeles, engrs. CD 1/26.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ CALIFORNIA—State Div. Hys., P. Wks. Bldg., Sacramento,
MacDonald, Young & Nelson, Inc., 351 California St., San Francisco, and Morrison-Knudsen Co., 74 New Montgomery St., San Francisco, Calif., CA $4,194,461, est. $5,600,000. ramp construction revision of distribution structure on Oakland approach, Oakland-San Francisco Bay Bridge, Alameda and San Francisco Counties. Bids Feb. 24. CD 3/2, under LB.

▲ Tumblin Co., 2901 "H" St., Bakersfield, Calif., CA, $1,161,000. site development, Areas A and B and stadium, BAKERSFIELD, CALIF. Kern County High School & Junior College Dist., 312 Bernard St., Bakersfield, Calif. Bids Feb. 26, awarded Mar. 3. CD 3/8, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

Christiansen Bros., 209 W. 13 South St., Salt Lake City, Utah, LB $812,000. CLASSROOM bldg. PROVO, UTAH, Brigham Young University, Provo, Utah. Bids Feb. 26. CD 6/8.

▲ Pozzo Constr. Co., 2403 Riverside Dr., Los Angeles, Calif., CA, $1,000,000, 2 story, rein.-con. OFFICE and STORAGE BLDG., LOS ANGELES, CALIF. City Center Corp., 3834 Wilshire Blvd., Los Angeles, Calif. Wm. D. Coffey, 649 S. Olive St., Los Angeles, Calif., engr. Raymond Shaw, 649 S. Olive St., Los Angeles, Calif., archt.

CANADA

BIDS ASKED—BUILDINGS

▲ Ont., Toronto—HOSPITAL ADDN.—B.A. 3/18—Women's College Hospital, 76 Grenville St., Toronto two wings, one wing 10 story, 45x120 ft., other wing 5 story, 50x70 ft., concrete, brick hospital addns. Wallace, Carruthers & Assoc., Ltd., 35 Isabella St. engr. Marani & Morris, 1250 Bay St., Toronto, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ J. Accurso Ltd., 1050 St. Laurence Blvd. Montreal, Que., CA, $1,092,805, fourth section, tributary sewer, Meilleur-Atlantic, MONTREAL, QUE. Municipality City Hall, Montreal, Que. Bids Dec. 11. CD 11/13.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Avenue Park Investments Ltd., c/o J. Daniels, archt., 1398 Eglinton Ave. W., Toronto, Ont., Owner Builds. est. $2,000,000 APARTMENT block corner Wilson Ave. and Avenue Rd., TORONTO, ONT. CD 2/4.

▲ Habitation Laurier Ltd., 189 Principal St., Hull, Que. Owner Builds, $1,000,000, 120 concrete, brick DWELLINGS On Blvd. Fournier, HULL, QUE. CD 3/2.

▲ Laurendale Homes Ltd., 1500 Lucerne Rd., Montreal, Que., Owner Builds, $2,500,000, 200 bungalow HOUSING, Sherbrooke St. E., MONTREAL, QUE.

▲ Laurendale Homes Ltd., 1500 Lucerne Rd., Montreal, Que., CA, Owner Builds, $1,250,000, 100 BUNGALOWS, near Gouin Blvd. East, MONTREAL NORTH, QUE.

▲ Bourget Construction Inc., 1035 Cote de Marguerite St. Laurent, Que., Owner Builds, $1,110,000. 89, one and half story, concrete, brick, COTTAGES on Cedar Park POINTE CLAIRE, QUE. CD 1/25.

(Proposal Advertisements see pp. 146 to 149)

THE LATEST DEVELOPMENTS IN HIGHWAY AND AIRPORT FORMS

• All paving forms should perform two distinct functions. First, they should accurately confine the limits of the pour, and, secondly, they must act as track, supporting and steering the massive machinery required to prepare the subgrade, spread, finish and cure the slab.

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UNIT PRICES

Low concrete prices win Maine bridge contract

A. P. Wyman, Inc., low bidder on the Emden-Solon Bridge, submitted prices for concrete in abutments, in piers, and in piers under water, lower by 44%, 37% and 56% respectively than the second low bidder's. The difference between these three items alone totaled $22,300 and was more than the total difference between the two bids.

The proposed bridge, in Somerset County over the Kennebec River, will be 525 ft long with a 24-ft roadway. The contract calls for four steel plate girder spans; two concrete T-beam spans; a concrete substructure; and 675 lin ft of approaching roads. The job will be completed in 150 working days.

H. R. Wood, second low bidder, underbid the winner on 24 and equaled him on five of the 50 items, bringing the total difference between their bids to $16,287. Wyman's bid of $304,187 was lowest of eight. The Maine State Highway Commission made the award. Bidders include:

1C A. P. Wyman, Inc., Waterville, Maine $304,187
2 H. R. Wood, Fairfield, Maine 320,256
8 Norman E. Jackson, Inc., Pittsfield, Maine .. 401,396

Bids: 1-20-54 Items	Unit	Quantity	Unit Prices 1C	2
Remove trees, 9"-24"	ea	3	$40.00	$25.00
over 24"	ea	1	80.00	50.00
Earth excavation	cy	2,100	1.00	2.50
Struct earth exc, drainage	cy	45	3.00	2.00
abutments	cy	1,200	1.75	2.50
Struct rock exc, abutments	cy	135	5.00	4.50
Struct earth exc, piers	cy	670	3.00	3.00
Struct rock exc, piers	cy	335	5.25	6.00
Granular borrow	cy	2,400	0.85	1.00
Gravel base	cy	2,200	1.25	1.50
Overhaul—in place measure	ydmi	4,800	0.10	0.10
pit measure	ydmi	4,800	0.08	0.08
Gravel surface	cy	215	5.00	2.00
Bit conc surf crse, type A	t	245	20.00	18.40
type B	t	429	18.00	16.60
Road tar	gal	1,330	0.35	0.35
Tack coat	gal	180	0.35	0.30
Asph coat corr met pipe 12"	lf	33	2.50	3.25
18"	lf	244	3.50	4.14
Conc in abutments	cy	190	25.00	45.00
Conc in piers	cy	755	24.00	38.00
Conc in piers under water	cy	530	12.00	27.00
Conc in superstructure slab on steel	cy	330	58.00	59.00
Concin T-beam slab	cy	220	63.00	66.00
Concrete rail	lf	1,050	6.00	8.00
Portland cement	bbl	2,925	5.25	5.00
Expansion bearings	sets	10	35.00	48.80
Str stl, delivered	lb	560,000	0.16	0.144
Str stl, erected	lb	560,000	0.045	0.05
Reinf stl, delivered	lb	130,160	0.10	0.095
Reinf stl, placed	lb	130,160	0.03	0.04
Stl H-beam piles	lf	2,700	5.00	4.94
Rem exist superstructure	ls	1	6,500	5,000
Cofferdams, pier #1	ls	1	5,000	3,500
pier #2	ls	1	4,400	4,000
pier #3	ls	1	5,500	5,000
pier #4	ls	1	5,000	4,000
pier #5	ls	1	4,300	3,500
Granite edging	lf	125	3.50	5.50
Granite edging, circular	lf	40	5.00	7.00
Guard rail, type G	lf	720	2.50	2.75
End wings	ea	8	5.50	5.50
Rip-rap, hand laid	cy	540	8.50	8.00
Stone blanket	cy	725	7.00	5.00
Loam borrow	cy	350	3.00	2.50
Sodding	sy	65	1.50	10.00
Seeding, roadside mixture	unit	19	15.00	12.00
Project markers	ea	2	25.00	10.00
Right-of-way monuments	ea	14	12.00	10.00

Wide-flange beam bridge and surfacing, Vermont

Over five miles will be surfaced and a steel bridge will be built under the terms of a $321,354 contract awarded by the Vermont Department of Highways. Frank W. Whitcomb, low bidder, underbid his nearest rival by less than 1% to win the award. Daniel W. Allen is the engineer.

The 20-ft wide bituminous surface will have a subbase of gravel and a base course of cutback asphalt with a peastone seal.

The steel bridge will be constructed on treated timber piles and paved with bituminous concrete.

Minimum wage rates include skilled labor, $1.50 per hr; semi-skilled labor, $1.10 per hr; and common labor, $1.00 per hr. Bidders include:

1C Frank W. Whitcomb, Bellows Falls, Vermont $321,354
2 Lewis & Scott, Andover, Massachusetts 324,416
7 Lambert Const. Co., Inc., White River Junction, Vermont 416,326

Bids: 1-15-54 Item	Unit	Quantity	Unit Prices 1C	2
Common excavation	cy	137,500	$0.65	$0.50
Solid rock excavation	cy	2,500	3.00	3.00
Borrow	cy	1,000	0.50	0.40
Trench exc of earth	cy	2,500	2.00	2.00
Trench exc of rock	cy	160	7.00	6.00
Clearing & grubbing	ac	15	600.00	400.00
Fine grading—subgrade	sy	102,000	0.05	0.08
Channel exc of earth	cy	1,130	0.80	1.00
rock	cy	160	2.00	2.00
unclassified	cy	8,525	0.80	0.50
Struct exc	cy	250	2.00	5.00
Roadway patrol maint	day	31	60.00	40.00
Maint traffic for bridge	ls	1	250.00	500.00
Cut & remove trees	ea	330	30.00	30.00
Dust control	mgal	310	5.00	5.00
Muck excavation	cy	700	0.80	0.70
Bulldozer rental	hr	10	15.00	15.00
Sub-base of gravel	cy	63,800	0.80	0.90
Sub-base of crush grav	cy	5,300	2.00	3.00
Gravel overhaul	cymi	134,500	0.08	0.08
Gravel backfill	cy	130	3.00	2.00
Strip gravel pits	cy	5,000	0.25	0.20
Stab grav bse crse of cutb asph with peastone seal	ga	89,600	0.30	0.24
Bit conc pvmnt for bridge floors	t	34	24.00	25.00
Concrete, class B	cy	175	54.00	60.00
Reinforcing stl	lb	25,470	0.14	0.14
Struct steel	lb	167,481	0.14	0.14
Asph asbestos coating	sy	25	8.00	4.00
Cement rubble masonry	cy	125	35.00	40.00
Reinforced conc pipe, 15"	lf	160	3.25	3.50
18"	lf	492	4.50	4.50
24"	lf	168	6.00	6.00
30"	lf	104	8.00	12.00
36"	lf	52	12.00	20.00
48"	lf	64	18.00	30.00
72"	lf	72	35.00	60.00
Asph ctd corr galv met pipe, 15"	lf	300	3.00	3.50
18"	lf	850	4.00	4.50
30"	lf	40	7.00	15.00
Relay pipe culverts	lf	1,500	1.00	1.00
Rem prerent superstruct	ls	1	425.00	1,000
Furn equip for driving piles	ls	1	1,000	1,500
Treated timber piling	lf	1,320	2.90	2.10
Cutoffs for timber piling	lf	120	2.90	2.10
Met shoes for tim piling	ea	40	5.00	10.00
Stone fill	cy	982	1.60	6.00
Stone fill for slope prot	cy	1,600	1.00	6.00
Perf asph ctd corr galv metal underdrain, 6"	lf	1,200	1.60	1.25
Drop inlet grates	ea	3	25.00	50.00
Two cable guard rail	lf	2,214	1.35	1.50
Wood guide posts	ea	1,450	7.00	7.50
Erect project markers	ea	2	25.00	50.00
Boundary markers	ea	104	10.00	10.00
Seeding	sy	300	0.40	0.25
Sodding	sy	50	2.00	1.50
Topsoil	cy	10	3.00	3.00
Mulch	sy	70,000	0.08	0.10
Anchors for two cable guard rail	ea	8	32.00	35.00

Cities have plans, can get money for billions in improvement work

Survey verifies forecasts of increased municipal work, bolsters U. S. optimism on construction prospects

U. S. cities haven't been thinking at all in terms of anti-recession measures, but they have plans—and can get the money—to handle construction programs running well into the billions over the next five years.

A survey conducted by the Municipal Finance Officers' Assn., for the benefit of the President's Council of Economic Advisors showed a bright picture of the municipalities' plans. It makes clearer the reasons for optimism of the council in its views of the general U. S. economic situation (ENR Mar. 11, p. 21).

The municipal finance group sent questionnaires to 334 municipalities of over 10,000 population, got filled-out replies from 147. Conclusions included:

- A total of 141 communities said they planned facilities adding up to $4.9 billion over the next five years. They will spend 24.1% of this money in 1954; 19.8% in 1955; 17.2% in 1956; 16.4% in 1957 and 15.8% in 1958. (There's an adidtional 6.7% not assigned to any one year.)
- The cities are scheduling their programs almost entirely on a basis of community need, and not with an eye on making work or maintaining business or employment levels.
- With a very few exceptions, the cities have ample means of obtaining funds to finance the programs planned.

• Order of business—The survey found that the backlog of plans and specifications available for the works proposed is small, in relation to the dollar volume of anticipated expenditures: The cities reporting said that about 36% of the anticipated spending is represented by plans half or more completed. But they added that there wouldn't be any undue delay under the current plans because of this shortage.

The order of importance of municipal projects, as reflected by the existing planning backlogs, is interesting. First in importance apparently are improvements to streets and roads; second, storm and sanitary sewers; third, water and other utility facilities. Schools and libraries, and general municipal buildings come fourth and fifth on the list, respectively.

• Money to pay—The cities don't seem to be too much worried about paying for the work.

Almost all that reported said that some borrowing margin remained within their existing debt limits, and most also believe that there will be no hindrance to continued bond issuance. Interestingly, though, it appeared that many of the communities were leaning as far as possible in the direction of financing out of current revenues. However, officials said that every traditional means of financing would be called into play.

On one point, municipal officials were also agreed: They could handle their present programs, but any great call for expansion of those plans might make trouble from a financial viewpoint. Tax rates are climbing steadily, and increases in those rates to finance improvements must be carefully considered—both from the financial and the political viewpoints.

• Places to build—There seems to be no problem on land acquisition. Most of the cities already control land needed for the improvements, and can obtain more as required.

Only two municipalities indicated that land was not being acquired rapidly enough to meet project requirements. Of the total reporting, 77% said they now own or control more than 75% of the land required for work planned in 1954, and 57% of such land for projects to be built over the five-year period of the questions in the survey.

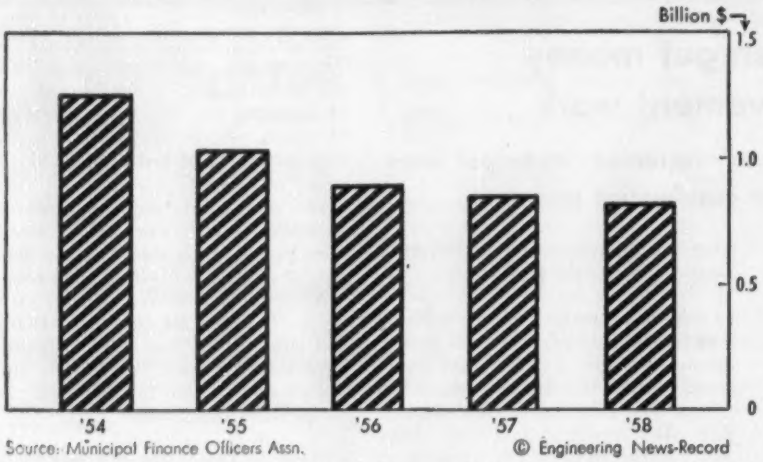
• Caution—Summing up the results of the survey, the MFOA cautioned that the fact that many municipalities did not or could not respond to some of the questions raised—particularly those calling for an opinion in the event of a slight drop in the economic level—is worth consideration.

"It would seem," the association

Future financing must come from borrowing because unused available tax sources are small . . .

30% of cities report they would borrow more for construction if tax and debt limits were removed

Size of city by population	Borrowing margin each year	Additional tax revenues available under current limits	Reduction in borrowing due to . . . tax limits	debt limits	Additional construction if tax, debt limits removed
	(millions)			(millions)	
All cities	$7296.7	$73.7	$127.4	$397.8	$806.4
1 1,000,000 or more	3013.7	0	0	0	500.0
2 500,000–1,000,000	1574.2	0	0	18.7	30.2
3 250,000– 500,000	907.0	13.8	21.2	113.8	58.0
4 100,000– 250,000	1248.1	30.2	48.8	209.4	161.9
5 50,000– 100,000	1027.4	25.4	52.3	53.5	56.2
6 25,000– 50,000	75.4	0.2	5.0	2.5	0
7 10,000– 25,000	80.8	4.2	0.1	0	0.1
No. of cities	76	28	9	21	27
% of cities reporting	84%	31%	10%	23%	30%



Source: Municipal Finance Officers Assn. © Engineering News-Record

CURRENT PLANS show how far in advance cities plan construction . . . 141 cities already have scheduled projects to cost $4.9 billion during the five years 1954-58 . . . future projects may be expected to push this total even higher.

Borrowing margin will increase during 1954-58 in 43% of cities

Size of city by population	Number reporting	% of cities reporting . . . borrowing margin will increase	decrease	remain same	. . . have no debt limit	. . . incomplete or no answer
All cities	90	43	18	18	1	20
1,000,000 or over	4	50	0	50	0	0
500,000–1,000,000	6	17	33	33	0	17
250,000– 500,000	10	40	10	30	0	20
100,000– 250,000	21	43	24	5	5	24
50,000– 100,000	38	45	18	21	0	16
25,000– 50,000	7	57	0	0	0	43
10,000– 25,000	4	50	25	0	0	25

Land acquisition is minor problem in future construction plans

77% of cities reporting say they control or own more than 75% of land needed for '54 projects . . . 57% have land for 1958 projects

Percent of land owned or controlled	Percent of cities having acquired land needed in . . . 1954	1955	1956	1957	1958
0 – 25	11	17	19	23	28
25– 50	3	7	8	6	2
50– 75	9	17	10	10	13
75–100	77	59	63	61	57
No. of cities reporting	70	59	51	49	47

said, "that municipalities do not view improvement programs from an anti-cyclical standpoint, but rather from the standpoint of what is the immediate need.

"It is also to be noted that if tax delinquencies increase, and yields from revenue sources directly related to the economic cycle (such as payroll income taxes) decreased, the generally conservative financial policies followed by municipalities would probably lead to diminishing construction demands."

U. S. reported considering the backing of local bonds

Expanding on reported government planning to counteract any serious downturn in the economy, a report from Washington said last week that economists are considering a new plan to put U. S. credit behind state and local bonds, if they are requested to do so.

(ENR, in an exclusive interview with Robinson Newcomb of the President's Council of Economic Advisers—p. 21 of its March 11 issue—reported that the U. S. wasn't planning any WPA-PWA-type programs, but would stress efforts to keep men employed, and to increase business and private purchasing power.)

According to the **New York Times,** the government's economic experts are also considering a plan—which would require special legislation—whereby the federal government would guarantee bond issues of states, cities and towns, upon request, in order to assure more favorable interest rates.

Under terms of existing legislation, government guarantees already are available on housing bonds for municipal projects.

School building finance heads for new highs

Reflecting a situation well known to both taxpayers and construction men, public school financing is rising sharply in 1954 over the record rate of 1953.

In the first nine weeks of this year, an ENR survey indicates, state and local governments have sold $296 million in bonds to finance school construction.

The total is 73% higher than the volume of such financing a year ago.

Other fields of financing are also making a good showing, compared with 1953, the survey shows. Total bonds sold by state and local governments in the first nine weeks of 1954 to finance all types of construction, reached $610 million—only 3% less than the figure for the same period of 1953.

Of this total, highway and waterworks financing so far this year total $81 million and $49 million, respectively, well up from a year ago. Financing for public buildings (other than schools) however, is down: Bridge bonds are down 86%, public housing financing is down 81%.

(*B&F Continued on page 144*)

TRIPLE ECONOMY

It's the biggest truck news of '54

Gross capacities up to 40,000 lbs. GVW with new Tandem-Axle BIG JOBS! Two all-new models, 4 wheelbases each. Priced with the lowest.

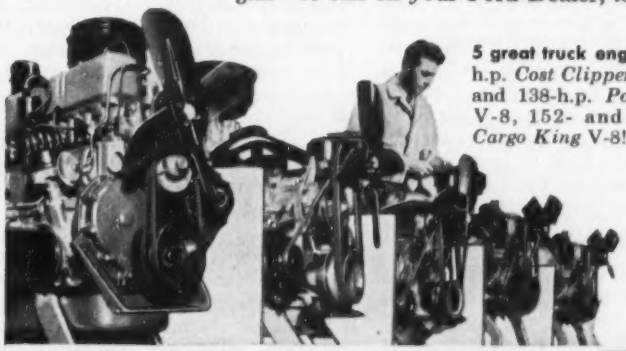
1. NEW LOW-FRICTION ENGINES offer power increases up to 23% with *gas-saving economy!* One reason: modern short-stroke design cuts down on internal friction waste as much as 33%!

2. NEW 3-MAN DRIVERIZED CABS cut fatigue. New long-wearing woven plastic seat upholstery. Exclusive Ford seat shock snubbers! Huge one-piece windshield!

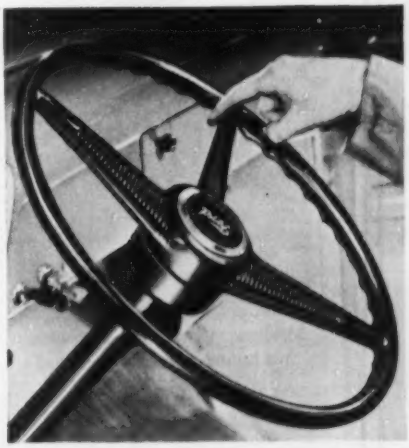
3. NEW CAPACITIES! New Factory-Built 6-Wheelers, up to 40,000 lbs. GVW! Two new Cab Forward BIG JOBS! Ford's 221 models offer low curb weights, top payloads!

Ford advances *further* with big new savings in all 3 vital truck areas! There's *more* gas-saving power! *Still better* drivers' working facilities! *Big* capacities, too!

New Ford Trucks for '54 offer the mightiest concentration of power per cubic inch ever built into *any* truck engine line! And, smaller-displacement engines like Ford's five new truck powerplants normally need *less* gas! That's only *one* big factor behind Ford Truck *Triple Economy* for 1954. For more information, write: Ford Division, Ford Motor Co., Dept. T-11, Box 658, Dearborn, Michigan—or call on your Ford Dealer, *today!*



5 great truck engines: 115-h.p. *Cost Clipper* Six, 130- and 138-h.p. *Power King* V-8, 152- and 170-h.p. *Cargo King* V-8!



NEW Ford Master-Guide Power Steering is standard on new Series T-800 and (with 152-h.p. V-8) T-700 BIG JOBS; optional at worthwhile extra cost on most other BIG JOBS. Cuts steering effort as much as 75%!

ONLY FORD gives you Gas-Saving, LOW-FRICTION, High-Compression, Overhead-Valve, Deep-Block engines in *all* truck models! Advancements like rotating valves increase valve life and full-flow oil filter lengthens engine life.

FORD *TRIPLE ECONOMY* **TRUCKS**

MORE TRUCK FOR YOUR MONEY

GRACE
Asphalt and Compaction Equipment

3 sweeper models, axle, engine or tractor powered.

Chip spreaders 8' to 12' width. Also asphaltic concrete spreaders.

Rapid Fire circulating heaters heat and unload large tanks of asphalt.

Sheepsfoot Rollers 250 to 600 psi.

Rapidspray Maintenance Distributors. Also heaters for production melting of barreled asphalt.

Pneumatic rollers 7 to 50 tons.

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THE LONGER LOOK:

New depreciation rules this year would have a big effect on spending for construction

What Congress does with depreciation allowances may well turn out to be its most important action in the whole tax field in 1954.

The Administration wants to loosen present tight restrictions on depreciation allowances, not only to remove inequities but to promote further expansion of the economy and to halt the current business slump. If business should respond to more liberal tax treatment on depreciation by increasing investment, the support given the construction and durable equipment industries might pull up the rest of the economy as well.

• **Construction booster**—Why is there such a close tie-up between depreciation tax allowances and business investment plans?

Since 1909, an allowance for depreciation of property has been recognized in tax laws as a legitimate business cost that can be deducted from income before taxes are figured. And, with corporate income tax rates now at 52%, few businessmen want to overlook any deduction the law allows. If half the annual cost of new investment, as represented by the depreciation allowance, otherwise would be taken in taxes, then a healthy deduction for depreciation can be a strong incentive for construction.

Internal Revenue regulations are fairly rigid about depreciation allowances. The original cost of the building, machinery or other capital asset, minus its prospective salvage value, must be divided by its expected useful life. The amount obtained through this calculation then may be set aside and charged as a cost each year until the original cost is recovered. In recent years there has been little flexibility as regards either the amount that can be set aside in any one year or the number of years over which the asset can be amortized. Largely because most businesses don't want to keep two sets of books, the tax regulations set the standards for their own accounting.

• **Straight-line criticized**—This practice of writing off the cost of an asset by a straight-line formula, meaning equal amounts each year, over the full useful life of an asset is drawing criticism on several counts.

(1) Depreciation, in the sense of loss of value through wear and obsolescence, doesn't happen in a "straight line." A machine is usually worked harder when it is new, and almost any durable item loses resale value faster in its early years than later. Straight-line formulas do not reflect this.

(2) Business would be more likely to invest in new plant and equipment if it could recover the bulk of the investment over its early, most productive years. Straight-line depreciation makes the cost an equal drag on earnings over the full life of the asset, regardless of its own value or the income of the business in uncertain distant years.

(3) Machines and buildings may be kept in use long after they should have been replaced, simply because much of their cost has not yet been written off.

• **Cost basis attacked**—Many businessmen also criticize the policy of using *original* cost rather than *replacement* cost in calculating depreciation. It is argued that depreciation allowances should enable a business to replace an asset when it is discarded; otherwise the business is losing its capital. However, this contention depends mostly on inflation for its force, and the relative price stability of the last two years has caused it to lose much of its importance as a current issue.

• **Eisenhower proposal**—To correct weaknesses in present tax treatment of depreciation and to encourage new investment, the Eisenhower Administration is supporting a proposal to allow greater flexibility. Specifically, it has urged that business be allowed to speed up amortization by writing off larger amounts of original cost in early years, though the *total* amount written off would be the same as under present law. The Administration proposal would permit writing off two-thirds of the cost of an asset in the first half of its expected useful life.

• **Opposition**—Objection to the program for accelerated amortization arises mostly from the current tax benefits it would give to business. Larger depreciation allowances would mean smaller corporate tax payments. However, as the total allowance on an investment would not be changed, de-

preciation allowances for tax purposes would be smaller in later years. Unless corporate rates are cut—which of course is possible—or a business has little or no taxable income before depreciation in these later years, higher tax payments then would offset low payments in early years.

There is a more subtle effect on tax payments. If a business makes fairly steady new investment each year, its tax gains on new investment would continue to offset the higher taxes due because older assets have largely been written off. As a result, the government's tax loss on the first few years of the accelerated program might never be recouped.

• **Long-term effect**—The Administration believes that any current tax loss, or postponement, will be more than offset by the increase in the productive capacity of the economy through the incentive given for investment. This would provide a bigger tax base in future years, as well as benefit the nation by preparing the foundations for higher living standards.

• **Short-term effect**—Of more immediate concern is the effect of liberalizing depreciation allowances on current investment plans of business. Present plans indicate capital expenditures on new plants and equipment by business will run about 5% lower in 1954 than in 1953. Tax cuts are expected to keep consumer spending power near the 1953 level. And increased state and local government spending will make up for the drop in federal spending. That is why sympathetic consideration is being given to a proposal which holds a promise of encouraging the economy's other big spender—the U. S. businessman.

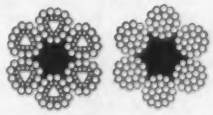
Business briefs . . .

• **Shovel company purchase**—Browning Crane & Shovel Co., of Cleveland, has been acquired by local and national interests represented by S. L. Albert, Akron industrialist, in a deal reported to involve nearly $2 million. The 55-year-old Browning crane company filed petitions in federal court in December for reorganization, and the company has been operating since that time under a federal referee in bankruptcy.

• **Hospital mortgages?**—Washington reports indicate consideration of extending FHA-style mortgage insurance to privately owned hospitals, via a plan to underwrite 99% redemption on foreclosure for 5%, 25-year bonds.

PROVING EXTRAORDINARY SERVICE—A Hercules Flattened Strand crane rope delivered 18 months service, compared to 6 months for ordinary rope. It performed equally well as a clamshell bucket rope. On a hot ladle crane it outlasted round strand rope by 4 to 1. It was chosen for its super strength to haul the car on the continent's largest cableway at Kitimat.

Can Flattened Strand solve your special wire rope problem?



Flattened Strand Round Strand

Hercules Flattened Strand is a special kind of wire rope that provides extraordinary service on special kinds of jobs.

The key to the difference is the triangular shape of the strands. Notice how the strands support each other; how the rope circumference is almost perfectly round; and how the core is smaller. There is 10% more steel in Hercules Flattened Strand than in round strand ropes of the same diameter. That means *10% more strength* and *10% greater safety*. Flattened Strand wears longer and more evenly... and is easier on sheaves and equipment.

If you can use this Super-rope, you'll soon begin saving time, labor, money. Why not investigate?

Because Leschen pioneered and perfected Hercules Flattened Strand wire rope, Leschen is your best source of additional information. Ask your Leschen man, or write for "The Flattened Strand Story."

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

Form-Lac

TREATED *Concrete* FORMS

Strip smooth and clean...

SAVE RUBBING AND FINISHING COSTS!

STRETCH THE LIFE OF YOUR PLYWOOD FORMS . . . GET SMOOTHER FINISH CONCRETE WITH FORM-LAC! FORM-LAC has saved thousands and thousands of dollars for users. Most effective, easiest to apply form coating you can buy on the market today. FORM-LAC gives plywood forms a tough, durable coating . . . provides greater resistance to moisture and the alkaline and abrasive action of concrete.

GET ALL THE FACTS . . . *Send* FOR THIS NEW, FORM TREATING MANUAL WITHOUT DELAY . . .

MAXWELL & HITCHCOCK, INC.

191 Simpson St., N.W.

Atlanta, Georgia

Gentlemen:

Without obligation, please send me your new **Form-Lac** "Question and Answer" manual on the treatment of plywood concrete forms.

Name _____

Title _____

Company _____

Address _____

Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	This Week	Cumulative 11 wks 1954	Cumulative 11 wks 1953	% chge
Federal	$7.6	$185.4	$367.9	−50
State and municipal	92.2	824.1	956.4	−14
Total pub.	99.8	1,009.5	1,324.3	−24
Total priv.	115.6	1,192.5	2,059.1	−43
U. S. total	**$215.4**	**$2,202.0**	**$3,383.4**	**−35**

Contracts by type of work

Waterworks	$2.6	$40.6	$48.0	−15
Sewerage	6.1	63.2	77.0	−18
Bridges	5.9	94.1	142.7	−34
Highways	20.4	242.6	249.0	−3
Earthwork, waterways	5.0	59.8	89.3	−33
Buildings:				
Public, excl. hsg.	52.0	327.1	361.2	−9
Housg., pub.	4.9	39.9	165.9	−76
Housg., priv.	49.9	613.8	908.7	−32
Commercial	30.7	221.6	180.5	+23
Industrial	30.5	310.9	823.5	−62
Unclassified	7.4	188.4	337.6	−44
Total	**$215.4**	**$2,202.0**	**$3,383.4**	**−35**

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

New capital for construction

(millions of dollars)	Week of Mar. 11 1954	Cumulative 10 Wks 1954	% chge 1953-54
Corporate securities	$93.9	$631.7	−4
State and municipal:			
Excluding housing	95.4	684.0	+18
Housing	0.9	21.9	−80
Federal loans	1.5	21.0	−15
Federal aid	...	...	...
Total non-federal	**$191.7**	**$1,358.5**	**−1**
Federal appro.:			
In U. S.	...	...	...
Outside U. S.	...	...	...
Total new capital	**$191.7**	**$1,358.5**	**−1**

ENR indexes		Base years = 100 1913	1926	1949
Constr. cost	Mar '54	613.99	295.14	128.71
	Feb '54	614.71	295.49	128.86
Bldg. cost	Mar '54	437.17	236.32	124.27
	Feb '54	437.55	236.53	124.38
Volume	Feb '54	345	140	100
	Jan '54	338	137	98

OFFICIAL PROPOSALS

Bids: March 31, 1954

Repairs to Sunrise Reservoir

Sealed proposals will be received for furnishing materials, labor, equipment and services for making repairs and improvements at the Sunrise Reservoir, Portsmouth, Ohio, until 12:00 o'clock noon, Eastern Standard Time, Wednesday, March 31, 1954.

This work, known as "Repairs to Sunrise Reservoir", includes grouting under existing floor, placing new floor slab inside reservoir, installing reinforced concrete cribbing, placing embankment, and other miscellaneous items.

Proposals shall be addressed to the City Manager of the City of Portsmouth, Ohio, sealed and endorsed "Proposals for Repairs to Sunrise Reservoir", and mailed or delivered to the City Manager.

Each proposal shall be accompanied by a certified check on some solvent bank, drawn payable to the City of Portsmouth, Ohio, in an amount equal to ten per cent (10%) of the price bid, such check to be forfeited to the City of Portsmouth, Ohio, as liquidated damages in case of failure on the part of the successful bidder to execute a contract and furnish satisfactory surety bond within ten (10) days after the acceptance of the proposal. In lieu of a certified check bidders may furnish a bid bond satisfactory to the City.

The check of the successful bidder will be returned if the contract is executed and the necessary bond furnished, and to the unsuccessful bidders after award is made and contract entered into.

The City Manager reserves the right to accept any bid or to reject any or all bids should he deem it to be for the best interests of the City of Portsmouth, Ohio.

Plans, specifications, form of proposal and contract are on file and available for inspection at the office of the City Manager and at the Engineer's office. Copies of the documents required for review and bidding purposes may be obtained only from the Engineers, Alfred LeFeber & Associates, Consulting Engineers, 2933 Woodburn Avenue, Cincinnati 6, Ohio, upon deposit of $10.00; $5.00 of which will be refunded upon the return of plans and specifications in good condition within thirty (30) days from the taking of bids.

The City reserves the right to hold all bids for thirty (30) days before final acceptance thereof.

CITY OF PORTSMOUTH, OHIO
by: Chas. S. Stevenson
Acting City Manager

Feb. 24 & March 3, 1954

Bids: April 6, 1954

Furnishing and Installing Power Equipment

PROCUREMENT DEPARTMENT, CITY OF Philadelphia. Sealed proposals will be received in Room 313, City Hall Annex until 1:30 P.M. (E.S.T.) Tuesday, April 6, 1954 on BID NO. 4411 for Department of Public Property, Engineering Branch Contract No. 713: FURNISHING AND INSTALLING MERCURY-ARC POWER RECTIFIER EQUIPMENT IN SUBSTATION NO. 10 AT FRANKFORD AVENUE AND LINDEN STREET; ONE UNIT OF 13.2 KV SWITCHGEAR AND CONTROLS; AND ONE 600-VOLT, D.C. SWITCHBOARD AND CONTROLS, and at that time will be publicly opened and read. The certified check required as a guaranty for the execution of the Contract in the amount given in paragraph 7 of the Standard Contract Requirements of the City of Philadelphia, 1950, shall be enclosed with the Proposal. Specifications, Plan, and Pre-Qualification Questionnaire may be obtained from the Engineering Branch, Room 1325, City Hall Annex, upon making a deposit of $25.00 in cash or by certified check made payable to the City Treasurer of the City of Philadelphia, which will be refunded upon return of the documents in good condition within 10 days after the Contract is awarded. The form of contract and the bonds may be obtained from the Law Department, Room 715, City Hall Annex. NOTICE: No bids for this work will be received unless the Qualification of Bidders Questionnaire Form furnished by the Department is filed with all questions fully answered with the Chief of the Engineering Branch, Department of Public Property, Room 1305, City Hall Annex, at least one week before the date set for opening of bids. The Procurement Commissioner reserves the right to reject any or all bids. A. ALBERT CHERASHORE, PROCUREMENT COMMISSIONER.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4137) will be received at Lindsay, California, until April 22, 1954, for furnishing labor and materials for earthwork, pipe lines, and structures including pumping plants, laterals, and sublaterals, Unit 3, Delano-Earlimart Irrigation District, Friant-Kern Canal Distribution Systems, Central Valley Project, California. Location near Delano, California. Principal items are: 274,500 cu. yds. excavation; 50 miles concrete pipe lines, 12 to 63 inches; 2,900 cu. yds. concrete; 244,000 pounds, installing 59 pumping units; 167,000 pounds, furnishing and installing steel discharge pipes; and other work. Completion time varies 300 to 600 days. For particulars, address Bureau of Reclamation, Lindsay, California; or Building 53, Denver Federal Center, Denver, Colorado. W. A. Dexheimer, Commisioner.

OFFICIAL PROPOSALS

Bids: March 30, 1954

Route 47, Section 9A and Route 49, Section 15A

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Department for:

Route 47, Section 9A and Route 49, Section 15A, High Street and Main Street, Pavement Reconstruction, City of Millville, Cumberland County. Length 0.794 miles. The principal items of work are:

Estimated:

9,651	cu. yds. Roadway Excavation—Unclassified
21,162	sq. yds. 4" Gravel Base Course
18,604	sq. yds. 5" Macadam Base Course
18,604	sq. yds. 3" Pen. Mac. Inter. Course
18,604	sq. yds. Pavement Type MA-BC-2 3" thick
398	lin. ft. Reinforced Conc. Culvert Pipe
1,562	lin. ft. Corrugated Metal Culvert Pipe
44	Inlets
7,330	lin. ft. 9" x 17" Concrete Curb
7,885	sq. yds. Concrete Sidewalk

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, March 30, 1954, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed:
STATE HIGHWAY DEPARTMENT
A. Lee Grover, Chief Clerk

OFFICIAL PROPOSALS

Bids: March 30, 1954

West Virginia Turnpike Commission

Sealed proposals will be received by the West Virginia Turnpike Commission for:
CONTRACTS NOS. 47, 47A, 47B and 47C

The work to be done under Contracts Nos. 47, 47A, 47B, 47C consists generally of furnishing all labor and materials for preparing and field painting all metalwork surfaces of superstructure steelwork of all the bridges which form a part of the West Virginia Turnpike.

The work will be let either under a single Contract No. 47, for the entire work, or under three separate contracts, Contracts Nos. 47A, 47B and 47C.

The work under Contract No. 47A includes all bridges situated in Sections 1 and 2 of the turnpike, not including the Bluestone River Bridge (Bridge No. 8). Contract No. 47B includes all bridges in Section 3 of the Turnpike not including the Four Mile Fork Bridge (Bridge No. 73) and the Kanawha River Bridge (Bridge No. 89). Contract 47C includes only the Bluestone River Bridge (Bridge No. 8), the Four Mile Fork Bridge (Bridge No. 73) and the Kanawha River Bridge (Bridge No. 89).

The approximate tonnage of bridge superstructure steelwork in each of the several contracts that is to receive field coats of paint is as follows:

Contract No. 47A.....	3,830 tons
Contract No. 47B.....	7,130 tons
Contract No. 47C.....	7,780 tons
Contract No. 47.....	18,740 tons

Proposals will be received at the office of the West Virginia Turnpike Commission, 1340 Wilson Street, Charleston 5, West Virginia, until 1:00 p. m., Eastern Standard Time, and thereafter at the House of Delegates Chamber, State Capitol, Charleston, West Virginia, until 2:00 p. m., Eastern Standard Time, on March 30, 1954, at which time and place said proposals will be publicly opened and read.

Contract documents may be seen and may be inspected by prospective bidders during office hours, after March 6, 1954, at the office of the Engineers, Howard, Needles, Tammen & Bergendoff, 804 Greenbrier Street, Charleston, West Virginia, and 55 Liberty Street, New York 5, New York.

WEST VIRGINIA TURNPIKE COMMISSION
D. H. Morton
Chairman

March 2, 1954

Bids: March 30, 1954

Route 23, Section 16A

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Department for:

Route 23, Section 16A, from Sussex to Colesville Road, Bridges & Approaches, Wantage Township, Sussex County. Length 0.568 miles. The principal items of work are:

Estimated:

	Roadway Items
740	cu. yds. Roadway Excavation—Rock
3,800	cu. yds. Roadway Excavation—Earth
2,950	cu. yds. Borrow Excavation
10,837	sq. yds. Gravel Surface Course 12" thick and Gravel Shoulder 10" average thickness
10,046	gal. Surface Treatment, Bituminous Materials
180	lin. ft. Reinforced Conc. Culvert Pipe
60	lin. ft. 50" x 31" Corrugated Metal Pipe Arch Bituminous Coated Paved Invert
1,116	lin. ft. Wire Rope Fence
478	lin. ft. Reset Wire Rope Fence
1,630	lin. ft. Field Fencing
	Bridge Items
1,029	cu. yds. Concrete in Structures
47,562	lbs. Reinforcement Steel

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, March 30, 1954, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed:
STATE HIGHWAY DEPARTMENT
A. Lee Grover, Chief Clerk

OFFICIAL PROPOSALS

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed:
STATE HIGHWAY DEPARTMENT
A. Lee Grover, Chief Clerk

Bids: April 20, 1954

Construction of Substructure

NEW YORK STATE BRIDGE AUTHORITY
Advertisement for Proposals
for the
Construction of the Substructure
of the
Kingston Rhinecliff Bridge
Across the Hudson River.

The New York State Bridge Authority will receive sealed proposals for the construction of Contract No. 1, Substructure, of the Kingston Rhinecliff Bridge over the Hudson River until 2:00 P.M. Eastern Standard Time, on the 20th day of April, 1954, at the Authority's office, 22 Ferry Street, Kingston, New York, at which time and place proposals will be publicly opened and read aloud.

The work includes the construction of two abutments and twenty-two piers on land and eight piers in the river. The principal items of work include:

	Approximate Quantities
Bridge Excavation, Dry	12,000 cu. yds.
Bridge Excavation, Wet	12,000 cu. yds.
Concrete, Land Piers & Abutments	14,000 cu. yds.
Concrete, River Piers	47,000 cu. yds.
Granite Masonry	1,400 cu. yds.
Bar Reinforcement	2,700,000 lbs.
Structural Steel	500,000 lbs.
14" BP 89# Steel Bearing Piles	100,000 linear feet
Cast-In-Place Concrete Piles	9,000 linear feet

Plans, Specifications and Proposal Form for the work are on file in the office of the New York State Bridge Authority and in the Branch Office of D. B. Steinman, Consulting Engineer, 96 Liberty Street, New York, N. Y. and may be inspected by prospective bidders during office hours.

Plans, Specifications and Proposal Forms may be obtained from D. B. Steinman, Consulting Engineer, 96 Liberty Street, New York, N. Y., upon application and payment of a fee of fifty ($50.00) dollars, no part of which will be refunded.

Bids must be made upon the proposal forms included in the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of the New York State Bridge Authority for the sum of three hundred thousand ($300,000) dollars.

The right is reserved to reject any or all bids.

NEW YORK STATE BRIDGE AUTHORITY
James F. Loughran, Chairman

March 10, 1954

Contractors Watch This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS

Bids: April 6, 1954

Construction of Dam

UNITED WATER CONSERVATION DISTRICT OF VENTURA COUNTY, CALIFORNIA

For the construction of the Santa Felicia dam and appurtenant works, in Ventura County, California.

A-1. Sealed proposals for constructing, in accordance with the District's specifications therefor numbered 1, the Santa Felicia dam and appurtenant works will be received by the United Water Conservation District at its office building at 806 Railroad Avenue, Santa Paula, California, until 2:00 p.m., April 6, 1954, at which time they will be publicly opened and read; *provided*, that the District reserves the right to change the place of bid opening, if necessary, to the Ebell Clubhouse, 125 South 7th Street, Santa Paula, California, in order to accommodate the number of bidders present. The work is located on Piru Creek near the town of Piru in Ventura County, California.

A-2. The work includes construction of a zone type rolled earth embankment, approximately 1,200 feet long at the crest and approximately 275 feet maximum height above the lowest part of the foundation; a cutoff trench with 220 foot maximum bottom width to suitable foundation for the full length of the dam; foundation grouting; a gateless concrete spillway on the right abutment; and an outlet works through the embankment.

A-3. Award will not be made to more than one bidder nor for less than all the items of the work. The District reserves the right after opening bids to reject all bids or to make award to the lowest reponsible bidder and reject all other bids. Bids will be compared on the basis of the Engineer's estimate of quantities of the several items of work as shown in the Bidding Sheet.

A-4. A bidder must furnish as part of his proposal a full and explicit statement of his plan or layout for performing the work, including a complete description of proposed construction plant and detailed program for construction. He must also submit with or in advance of his proposal a comprehensive statement of his experience and financial condition on forms furnished by the District (Form 2-6). Failure to comply with these requirements will render a bid informal and shall be sufficient cause for its rejection.

A-5. Notwithstanding any provisions to the contrary appearing in the Instructions to Bidders each proposal must be accompanied by a certified or cashier's check, or by a corporate surety bond on form furnished by the District, as a guaranty that the bidder will, if an award is made to him in accordance with the terms of his proposal, promptly secure workmen's compensation insurance, execute a contract in the required form, and furnish satisfactory bonds for the faithful performance of the contract and for the payment of claims of materialmen and laborers thereunder. Said check or bond shal be in an amount not less than 10 percent of the estimated contract payments for the maximum amount of work which may be awarded the bidder in accordance with the terms of his proposal. The faithful performance bond shall be in the smalles sum which is a multiple of $1,000 and not less than 50 percent of the estimated aggregate amount of the payments to be made under the contract, computed on the basis of the quantities and unit prices stated in the Bidding Sheet. The bond for materialmen and laborers shall be in the sum required by Chapter 3 of Division 5, Title 1 of the Government Code of the State of California.

A-6. In accordance with the provisions of the California Labor Code, the Board of Directors of the District has ascertained the general prevailing rates of per diem wages and the general prevailing rates for legal holiday and overtime work in the locality in which the work is to be performed.

A-7. The dam will be located on Piru Creek, a tributary of the Santa Clara River, about five miles north of the town of Piru, Ventura County, California. The principal features include a rolled earthfill embankment, a low level outlet conduit through the embankment, and an ungated chute spillway.

Approximate quantities for the principal items of work are:

(a) Diversion and care of river	
(b) Stripping foundation and abutments rock and common	200,000 C.Y.
(c) Foundation excavation (cutoff trench)	450,000 C.Y.
(d) Impervious borrow	750,000 C.Y.
(e) River gravel borrow	3,000,000 C.Y.
(f) Spillway excavation	600,000 C.Y.
(g) Concrete in spillway and outlet work	30,000 C.Y.
(h) Placing reinforcement steel	2,500,000 Lbs.
(i) Miscellaneous metalwork, 60" pipe and gates	300,000 Lbs.
(j) Drilling grout holes	10,000 L.F.
(k) Pressure grounting	10,000 C.F.
(l) Rock riprap on upstream face only	60,000 C.Y.

Plans and specifications for the work can be secured at the District's office upon deposit of $25.00 per copy.

UNITED WATER CONSERVATION DISTRICT
By Julian Hinds
General Manager and Chief Engineer
March 10, 1954

Bids: April 15, 1954

Structural and Grading Work

GRADE CROSSING ELIMINATIONS THROUGH DUNELLEN AND PLAINFIELD, NEW JERSEY
THE CENTRAL RAILROAD COMPANY OF NEW JERSEY UNDER ORDER OF THE PUBLIC UTILITY COMMISSION, STATE OF NEW JERSEY

Sealed proposals will be received by The Central Railroad Company of New Jersey, at the office of the Chief Engineer, located at Jersey City Terminal, Room No. 44, Foot of Johnston Avenue, Jersey City, N. J., until 1:00 P.M. Thursday, April 15th, 1954, and publicly read at that time, for two contracts.

CONTRACT "A"—FOR STRUCTURAL WORK:

Construction of gravity and reinforced concrete box abutments and wingwalls for four (4) railroad bridges each supporting four (4) tracks as follows:

1—Over Rock Avenue, City of Plainfield, Union County, N. J.
2—Over Washington, Prospect and Madison Avenues, in the Borough of Dunellen, Middlesex County, N. J.
3—Related items of work consisting of coal trestle, pedestrian subway, box culvert, street grade changes, excavation, paving, concrete retaining walls, curbs, sidewalks, sewer and drainage lines, electric lighting, etc.

Structural steel for bridges to be furnished and erected by others; structural steel for the coal trestle to be furnished by the Railroad Company but to be altered and erected by the contractor.

Principal Quantities Involved:

Class "B" Concrete	6,000 cu. yds.
Class "C" Concrete	2,500 cu. yds.
Concrete Paving Base Class "D"	2,400 sq. yds.
Concrete Pavement	8,700 sq. yds.
Foundation Excavation	5,300 cu. yds.
Roadway Excavation	18,700 cu. yds.
Bituminous Paving	380 tons
Reinforcing Steel	603,200 lbs.
Concrete Piles (cast in place)	20,000 lin. ft.

The above work to be progressed in three stages, as follows:

First—Begin May 10, 1954 and complete November 1, 1954.
Second—Begin November 22, 1954 and complete May 15, 1955.
Third—Begin June 1, 1955 and complete September 1, 1955.

CONTRACT "B"—FOR GRADING:

Grading will include the construction of an earth embankment to carry four (4) elevated main line tracks with sidings for a distance of approximately 2.5 miles, beginning at Clinton Avenue, City of Plainfield, Union County, through the Borough of Dunellen, to Mountain Avenue, Middlesex, County, N. J.

Principal Quantities Involved:
Borrow Excavation—334,000 cu. yds. (in the completed embankment).

Run of Bank Gravel—51, cu. yds. (in the completed embankment).

The grading must be progressed in three stages, as follows:

First—Borrow Excavation—229,000 cu. yds. Run of Bank Gravel—35,000 cu. yds. Begin May 10, 1954 and complete October 15, 1954.

Second—Borrow Excavation—90,000 cu. yds. Run of Bank Gravel—14,000 cu. yds. Begin November 22, 1954 and complete May 1, 1955.

Third—Borrow Excavation—15,000 cu. yds.

Run of Bank Gravel—2,000 cu. yds. Begin June 15, 1955 and complete September 15, 1955.

Proposal forms, drawings, specifications, bond and insurance requirements for both CONTRACT "A" STRUCTURAL WORK and CONTRACT "B" GRADING may be obtained at the office of the Chief Engineer of the Railroad Company, at the above address, on or after March 29, 1954. Contractors may bid on Contract "A" Structural Work or Contract "B" Grading, or both. Drawings and specifications for each contract may be obtained upon application at the office of the Chief Engineer on a deposit of $25.00 per set. A refund in full will be made to bidders upon return of each set in good condition within 30 days of award or rejection of bids.

The work will be awarded as separate contracts for Contract "A" Structural Work and for Contract "B" Grading. The successful bidders for each contract will be required to perform with his own organization not less than 80% of the total value of the contract, except for materials or items of work which require specialized knowledge, craftsmanship or equipment not ordinarily available in the contractor's organization.

Bids must be made upon the standard proposal forms furnished for this purpose by the Railroad Company and must be enclosed in sealed addressed envelopes bearing, on the outside, the name and address of the bidder and the contract work bid upon, and must be accompanied by a certified check drawn to the order of the Treasurer of The Central Railroad Company of New Jersey, in the amount of $20,000. Bids and checks not enclosed in sealed addressed envelopes will be considered informal and will not be opened.

The Railroad Company reserves the right to repect any or all proposals.

S. L. Mapes, Chief Engineer
THE CENTRAL RAILROAD COMPANY OF NEW JERSEY
JERSEY CITY TERMINAL, JERSEY CITY 2, N. J.

U. S. Government

BIDS FOR CONSTRUCTION OF STEEL MATERIAL BARGES—Memphis District, Corps of Engineers, U. S. Army, P.O. Box 97, Memphis 1, Tenn. Sealed bids will be received at this office until 11:00 a.m., C.S.T., 25 March 1954, and then publicly opened for construction of ten steel material barges. Information on request.

Engineering News-Record

Reaches Your Local Contractors

Its distribution among the contractors of any one state is in proportion to the number of contractors situated in that state. The Official Proposal Columns of *Engineering News-Record* offer precisely the same efficient service to municipalities, counties, state and federal departments in every section of the United States.

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OFFICIAL PROPOSALS

Bids: April 1, 1954

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid funds, sealed proposals will be received until ten-thirty o'clock A. M., eastern standard time on the 1st day of April 1954, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1 G. L. Nickerson, District Engineer, 353 Broadway, Albany, N. Y.						
DISTRICT No. 2 L. Ketchum, District Engineer, 109 No. Genesee Street, Utica, N. Y.						
DISTRICT No. 3 William Robinson, District Engineer, 301 E. Water Street, Syracuse, New York						
DISTRICT No. 4 E. G. H. Youngmann, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
DISTRICT No. 5 C. R. Waters, District Engineer, 65 Court Street, Buffalo, N. Y.						
DISTRICT No. 8 J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Albany, Greene, Schen., Herkimer, Madison, Mont., Oneida, Cayuga, Onon., Seneca, Gen., Monroe, Ont., Erie, Orange, Rock., Ulster	T. T. S. 54-1	New York State Thruway—Catskill, Mohawk, Ontario and Hudson Sections	....	Furnishing & Erecting Interchange Traffic Signs	$10,000 Plans $10	$190,000
Note: Plans and proposals for this contract may be obtained at our Albany and New York City offices only.						
DISTRICT No. 1 G. L. Nickerson, District Engineer, 353 Broadway, Albany, N. Y.						
Rensselaer	FARC 54-7	Eagle Mills–Clums Corners, SH 631; Brick Church–Rock Hollow, SH 197 Proj. F-592(4)	3.92	Asphalt Concrete, Opt.	$9,000 Plans $10	$171,000
Washington	FARC 54-10	Granville–Troy Stage, SH 104 Granville Village, SH 5404 Pro.) F-523(7)	2.22	Asphalt Concrete, Opt.	$5,000 Plans $10	95,000
DISTRICT No. 2 L. Ketchum, District Engineer, 109 No. Genesee Street, Utica, N. Y.						
Herkimer	FARC 54-35	Little Falls–Dolgeville, SH 133 Manheim Center–Salisbury Center, SH 463 Proj. F-584(2)	7.57	Asphalt Concrete, Opt.	$27,000 Plans $10	495,000
Oneida	FASH 54-2 FARC 54-42	Clinton Forks–Middle Settlement Utica–Oneida Castle Pt. 1, SH 250 Deansboro-New Hartford, SH 761 Proj. S-854(3)	1.79	9" Cem. Conc. Pavt. 24' Wide	$19,000 Plans $15	324,000
DISTRICT No. 3 William Robinson, District Engineer, 301 E. Water Street, Syracuse, New York						
Cayuga and Seneca	FARC 54-18	Auburn–Seneca Falls Pts. 2 & 1, SH 5042–590 Proj. F-331(6)	8.29	Ashpalt Concrete, Opt.	$54,000 Plans $15	982,000
DISTRICT No. 4 E. G. H. Youngmann, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Livingston and Wyoming	FARC 54-44	Pavilion–Greigsville Pts. 2 & 3, SH 1777 Greigsville–Piffard, SH 1777-A Geneseo–Piffard, SH 718 Proj. S-217(2)	7.68	Asphalt Concrete, Opt.	$29,000 Plans $15	575,000
Monroe	FASH 54-1 FARC 54-39	Rochester–Bushnell Basin, Pt. 1 SH 8223, SH 766 & SH 60 Interchanges; Pittsford–Palmyra Pt. 1, SH 766; Despatch–Pittsford Pt. 2, SH 481; Fairport (Brighton–Fairport Pt. 2), SH 60 Proj. U-UG 1107(1)	10.38	9" Cem. Conc. Pavt. 2 @ 25' Wide = 7.74 Mi. Asp. Conc. Opt. = 1.07 Mi. Dual Type Pavt. (Cem. & Asp. Conc.) = 0.55 Mi. Grading & Drainage = 0.89 Mi. Misc. Work = 0.13 Mi. 7 Hy. Seps. Comp. I-Beams 180.1', 155.6', 243.3', 127.4', 200.9', 218.3', 179.3' 1 RR Sep. Plate Girder 185.5' 1 Br. Built-up Stringer 388' 1 Br. Twin Conc. Box 22.5' Each	$400,000 Plans $100	7,221,000
Wyoming	FARC 54-37	Wales Center–Varysburg Pt. 2, SH 8092 Proj. F-28(3)	6.33	Asp. Conc. Opt. = 6.32 Miles Misc. Work = 0.01 Mile	$25,000 Plans $15	460,000
DISTRICT No. 5 C. R. Waters, District Engineer, 65 Court Street, Buffalo, N. Y.						
Niagara	FARC 54-12	Hartland–Medina Pt. 1, SH 5431 Proj. F-181(2)	3.67	Asph. Conc. Opt. = 3.59 Miles Misc. Work = 0.08 Mile	$8,000 Plans $10	146,000
DISTRICT No. 6 J. H. Thomas, District Engineer, 30 West Main Street, Hornell, N. Y.						
Allegany	FARC 54-19	Belmont–Scio, SH 5476 Wellsville–Scio, SH 5129 Proj. F-332(6)	3.51	Asphalt Concrete, Opt.	$17,000 Plans $10	285,000
Schuyler	FARC 54-24	Bennettsburg–Perry City, Pt. 2, SH 1747 Proj. S-282(2)	4.31	Asphalt Concrete, Opt.	$15,000 Plans $10	272,000
Tioga	FARC 54-13	Owego–Campville Pt. 3, SH 1870 Proj. F-530(6)	4.24	Asphalt Concrete, Opt.	$21,000 Plans $10	369,000
DISTRICT No. 7 R. W. Sweet, District Engineer, 444 Van Duzee St., Watertown, N. Y.						
Clinton	FARC 54-23	Chateaugay–Lyon Mountain, Pt. 2, SH 8355 Proj. F-493(3)	7.69	Asphalt Concrete, Opt.	$22,000 Plans $10	388,000
Jefferson	FARC 54-14	Watertown–Sacketts Harbor–Henderson Pts. 2 & 1, SH 235–181 Sacketts Harbor, SH 1131 Proj. F-577(5)	7.70	Asphalt Concrete, Opt.	$13,500 Plans $10	243,000
DISTRICT 8 J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Columbia	FARC 54-2	Craryville–State Line, SH 762 Proj. F-564(6)	2.75	Asphalt Concrete, Opt.	$9,500 Plans $10	169,000
Rockland	FARC 54-41	Spring Valley–Knapps Corners, SH 689 Knapps Corners–Nyack, SH 5178 Project U-1096(1)	2.56	9" Cem. Conc. Pavt. 2 @ 24' Var. Wide Hy. Sep. Conc. Rigid Frame 106' Hy. Sep. Comp. I-Beam 118.2'	$110,000 Plans $15	2,040,000
Ulster	FARC 54-3	New Paltz–Plattekill, SH 572 New Paltz–Rifton, SH 308 Proj. F-613(10)	1.49	Asphalt Concrete, Opt.	$7,000 Plans $10	118,000
DISTRICT No. 9 F. W. Donovan, District Engineer, 71 Frederick St., Binghamton, N. Y.						
Broome	FARC 54-4	Bettsburg–McClure Pt. 2, SH 8285 Proj. F-360(9)	5.93	Asphalt Concrete, Opt.	$20,000 Plans $10	355,000
Otsego	FARC 54-5	Unadilla–Wells Bridge, SH 5229 Wells Bridge–Otego, SH 5153 Project F-628(5)	3.69	Asphalt Concrete, Opt.	$12,000 Plans $10	206,000
DISTRICT No. 10 M. E. Goul, District Engineer, Montauk Highway at Little East Neck Rd., Babylon, L. I., New York						
Nassau	FARC 54-15	Jericho Turnpike, SH 9020 Proj. F-1000(4)	1.86	Asph. Conc. Opt. = 1.69 Mi. Shoulder Stabilization = 0.15 Mi. Misc. Work = 0.02 Mi.	$12,000 Plans $10	210,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
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OFFICIAL PROPOSALS

Bids: April 1, 1954

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THE PORT OF NEW YORK AUTHORITY
AT BUILDING NO. 105
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CONTRACT O & M 222
PROPOSAL NO. 401

Sealed proposals for furnishing all labor, material and equipment necessary for paving and drainage improvements at Building No. 105, Port Newark, N. J., will be received at the office of the Department of Purchase and Administrative Services, The Port of New York Authority, Room 900, 111 8th Ave., New York 11, until 11:00 A. M. (E.S.T.) Thursday, April 1, 1954, at which time and place said proposals will be publicly opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, The Port of New York Authority, Room 900, 111 8th Ave., New York 11, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. The duplicate copy of the receipt is then to be delivered to the Department of Purchase and Administrative Services, Room 900, 111 8th Ave., New York 11, and you will be furnished with the contract documents. The deposit will be refunded if the documents are returned in good condition, not later than thirty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

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Squad Leaders—3 years responsible charge of squad on structural steel detailing.

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Please mail complete resume together with salary required to:

Howard, Needles, Tammen & Bergendoff
55 Liberty Street New York 5, N. Y.

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Heavy foundation work, including concrete, pile driving, cofferdam work. Must be able to ready plans and supervise work on sewerage disposal and filtration plants, bridges, heavy concrete foundation work. Working radius 100 miles from Hartford, Connecticut. We can offer a top proposition to the right man. All correspondence confidential. Must have references.

P-2041, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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For nationally known hydro-electric consulting engineering firm. Position offers opportunity to grow with the organization and participation in profits. Applicant must have broad experience in this specific field, and ability to organize and direct design. If you are qualified send photograph and outline of education and experience, including employers' names, your titles and duties, and references; also statement of acceptable salary range and approximate availability. Confidence will not be violated.

P-2102, Engineering News-Record
520 N. Michigan Ave., Chicago, Ill.

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P-2070, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

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PARTY CHIEF or Transitman—Municipal survey experience required, boundary surveys, subdivision, roads and sewers. Send personal experience summary. Location northern N. J. P-1932, Engineering News-Record.

ENGINEERS HAVING extensive highway department experience and ability to train men in location, layout, design, preparation contract drawings, and construction of highways for Near East project. Salary attractive, living conditions good. Submit experience and references. P-1950, Engineering News-Record.

ESTIMATOR-ENGINEER: Excellent opportunity with general contractor in New York area for energetic chief estimator with primary experience in heavy construction, public works projects. Give full details training and experience. P-2004, Engineering News-Record.

GRAVEL PLANT Superintendent for portable and stationary plant in Michigan and Indiana. State exact experience and wages. P-1810, Engineering News-Record.

STRUCTURAL STEEL Detail Draftsmen and Checkers. All types of Structures. Interested in only top quality men with five or more years highly successful experience. Send complete written information for investigational purposes. Bristol Steel and Iron Works, Inc., Bristol, Virginia-Tennessee.

ARCHITECTURAL DRAFTSMAN wanted with 4 years minimum experience in drafting plans for school and church work. Good pay and permanent position for man who can assume responsibility. Write P. O. Box 73, Lancaster, Ohio giving qualifications and experience or telephone Lancaster 2243.

CIVIL ENGINEER qualified & experienced to handle sewer, paving & water design & construction. Civil Service Status, retirement & payroll plan. Applicant should detail experience, including municipal & salary desired. State available date & enclose or refer references. Send applications to Personnel Office, City Hall, Fargo, N. Da.

GENERAL CONSTRUCTION firm wants estimator capable of handling complete bids. Salary open. Ajax Construction Co., 925 15th St., Washington, D. C.

ENGINEER — SUPERINTENDENT: — Northeastern Pennsylvania construction company requires services of experienced highway construction engineer who is capable of preparing estimates and of supervising construction. Reply giving name, address, age, education, experience, salary desired and date of availability. P-2051, Engineering News-Record.

WANTED — FORM Designer — Write Fully. P-2055, Engineering News-Record.

POSITIONS VACANT

ALUMINUM REDUCTION plant General Contractor now in process of expanding field supervisory force. Considering applications for area superintendents, assistant area superintendents, and mechanical superintendents. Submit complete details including age, education, experience, references, availability, and salary expected. P-2052, Engineering News-Record.

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SALES ENGINEER—Pittsburgh, Pennsylvania and Albany, New York territories open with established national concern selling prefabricated metal products to engineering and construction markets. Positions offered are permanent and present excellent future with aggressive, progressive and expanding organization. Engineering degree desirable. Previous sales experience unnecessary. Age 24 to 30. Car furnished. Complete training program. Salary and bonus. RW-1420, Engineering News-Record.

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SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

OVERSEAS PROJECTS Guide to most active constructors-engineers, oil co's., gov't. & UN groups hiring for foreign projects. Send $1. Cove-McKane Int., GPO Box 126E, NY 1, NY.

POSITIONS WANTED

GENERAL SUPERINTENDENT, 25 years diversified experience including industrial plant construction, heavy excavation soil and rock, docks and piers, concrete structures, highways, bridges, dams, sewer systems and treatment plants, water systems and pumping stations. Capable of assuming full responsibility on large job. Good background, know men and equipment. Good references, available any location immediately. PW-1764, Engineering News-Record.

PROJECT MANAGER, construction superintendent or engineer (graduate), 28 years experience heavy construction, industrial buildings, machinery. PW-1790, Engineering News-Record.

ESTIMATOR—GENERAL Contractor—Quantities, pricing, assemble competitive bids, industrial, public, monumental, complete office details, buy, schedule, expedite, handle subs long experience, excellent record—will relocate—Desire change. PW-1979, Engineering News-Record.

GRADUATE CIVIL Engineer—Reg. Ohio—13 years bridge & building design, detailing & estimating experience with fabricators, consultants, contractors & government. Desire opportunity to advance with company. Prefer North Central States. PW-1964, Engineering News-Record.

CONSTRUCTION EXECUTIVE — Age 41, B.S.C.E., Presently employed, Past 12 years as Project Manager on large heavy industrial projects, also 5 years as Engineer on Surveys, Design, etc. on Heavy Construction. Locating family of most importance. Prefer west. Strong on labor relations. PW-1965, Engineering News-Record.

CIVIL ENGINEER—B.S.C.E. Age 26. County Engineer in charge of all civil works in large midwestern community last 18 mos. Desires position of responsibility and leadership with progressive organization. Will travel or relocate. PW-1966, Engineering News-Record.

CIVIL ENGINEER: B.S.C.E., Reg. 31, single, 7 years experience; 3½ surveying and construction supervision, 3½ structural design. Desires position as engineer or superintendent for contractor on heavy construction in West. PW-1934, Engineering News-Record.

PROJECT MGR. Construction Supt. Engineering education, 50 yrs. age. Free to travel. 26 yrs. experience in industrial buildings and equipment installations. Know costs. 17 yrs. with one General Contractor. Resume upon request. PW-1929, Engineering News-Record.

MECHANICAL INSPECTOR completed overseas U. S. Government contract of heating and ventilating plumbing and sprinkler systems. Over twenty-six years experience erection repair and maintenance of heavy industrial, power plant, pumping stations and marine equipment. Available now. PW-1985, Engineering News-Record.

CONSTRUCTION MANAGER, Engineer, 25 years experience all types building, industrial and heavy construction. Box PW-1976, Engineering News-Record.

POSITIONS WANTED

POSITION WANTED: Field Office Manager, heavy construction. PW-2002, Engineering News-Record.

BUILDING ESTIMATOR, 20 years experience all type structures, pricing, sub-bids expediting etc.—Graduate registered engineer. PW-1910, Engineering News-Record.

HIGH GRADE construction man, seeking new connection as project manager of similar position, solicits inquiries from General Contractors. Long and thorough experience all types buildings, heavy construction docks, all details of contracting, bid to completion, both field and office. New York or vicinity preferred. PW-1759, Engineering News-Record.

ENGINEER, Reg. P.E. Reports, investigations. Settlement of contractors' claims, 45 years experience; design, construction. Turnpikes, tunnels, buildings, foundations, schools, etc. PW-2073, Engineering News-Record.

PROFESSOR—SPECIALIST in Structures and Mechanics of solids desires teaching position in south or southwest. Now full professor in large University but personal considerations make change to above location desirable. Doctor and Masters degrees with 16 years teaching and 10 in design. PW-2074, Engineering News-Record.

CIVIL ENGINEER, BSCE, 27, married desires position in General Contractor's organization. 3 yrs experience hospital and industrial construction. Eastern States desired. PW-2072, Engineering News-Record.

GENERAL SUPERINTENDENT, project manager offers 25 years broad experience in heavy construction. Interested in Thermal or Hydroelectric. Available immediately. PW-2033, Engineering News-Record.

ENGINEER/DRAFTSMAN 31, married, desires permanent location southern states. 12 years exp. civil, mech., piping, struct. and elect. Resume on request. PW-2035, Engineering News-Record.

CONSTRUCTION MANAGER or Superintendent, 30 years' experience heavy construction, roads, bridges, dams, airports. Heavy Turnpike experience. Good organizer. Available immediately. Location immaterial. PW-2036, Engineering News-Record.

CIVIL ENGINEER, 27, experienced in highway surveys, building and industrial construction supervision and inspection desires foreign or territorial employment, short or long term. PW-2025, Engineering News-Record.

ENGINEER ATTORNEY desires overseas employment. B.S.M.E., L.L.B., Reg. Eng. and Member of Bar D.C. Eight years experience includes engineering studies, patent law, negotiation and administration of construction contracts. PW-2017, Engineering News-Record.

CONSTRUCTION ENGINEER—Non-graduate, 5 years experience field layout and supervision, cost engineering, estimating, in heavy and commercial construction. Desire Rocky Mountain or Pacific Northwest. PW-2011, Engineering News-Record.

MILLWRIGHT SUPERINTENDENT available now. Can handle any job and will go any place. PW-2009, Engineering News-Record.

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GRADUATE CIVIL Engineer—33—11 yrs. exp. prestressed & reinf. concrete design and construction. Know French, Germ. Desire position in East Canada. PW-2016, Engineering News-Record.

PIPING SUPT, 30 years practical construction experience in stalling Oil Rfys-Chemical-Power pts-Mining Smelters etc. Wants connection with company on foreign wk. Speak fluent Spanish—handle and train native labor. PW-2083, Engineering News-Record.

ELECTRICAL SUPERINTENDENT being retired by major construction company after 30 years service. In good health and capable of supervision or work in advisory capacity in any phase of electrical industry. Complete history available upon request. Available July 1st, 1954. PW-2046, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT (General) prefer foreign work but will consider an interesting job in the States. 23 years experience on dams, tunnels, airports, bridges, industrial buildings and machinery installations, pumping plants, power plants, water works, roads, crushing and bath plants both design, installation and operation with concreting etc. PW-2010, Engineering News-Record.

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PW-2021, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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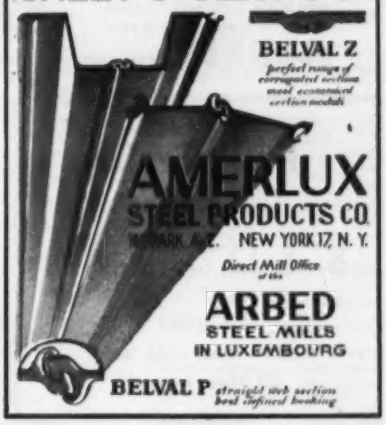

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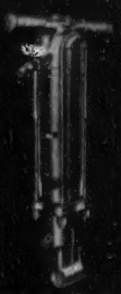

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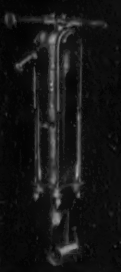

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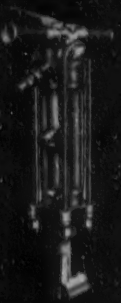

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CONSTRUCTION EQUIPMENT MANUFACTURERS FOR OVER HALF A CENTURY

¾-yd bolsters Michigan line

Newest addition to the line of ½- and ⅝-yd shovels produced by the Michigan Power Shovel Co. is a ¾-yd rig available in two truck-mounted models and one on crawlers.

For the operator it offers comfort. The cab is of modern design with full-visibility windows. An overhead window provides a good view for long, high boom operations such as steel setting. The cab is of unit design and is separated from the engine cab, thereby reducing engine noise. Controls are air operated.

The turntable base is a one-piece steel casting with hinge pin bracket and roller brackets cast integrally. Side frames are of unit design for rigidity of alignment. Six hook rollers mounted on anti-friction bearings provide a three-point mounting on the circle gear.

Primary and secondary reduction of power from the engine to the main drive is through two sets of spiral bevel gears that are completely enclosed and run in oil.

Standard equipment on the new unit is an independently operated worm gear boom hoist. The gear case is on the operator's side for easy accessibility. Fairleads are of the revolving type with anti-friction bearings on the sheaves and trunion.

Hoist and crowd drums are mounted on the same shaft and operated by air ram multiple segment clutches. Each drum has a 30-in. dia brake.

Inside counterweights are mounted on guide posts and may be raised or lowered by power from the crane mechanism.

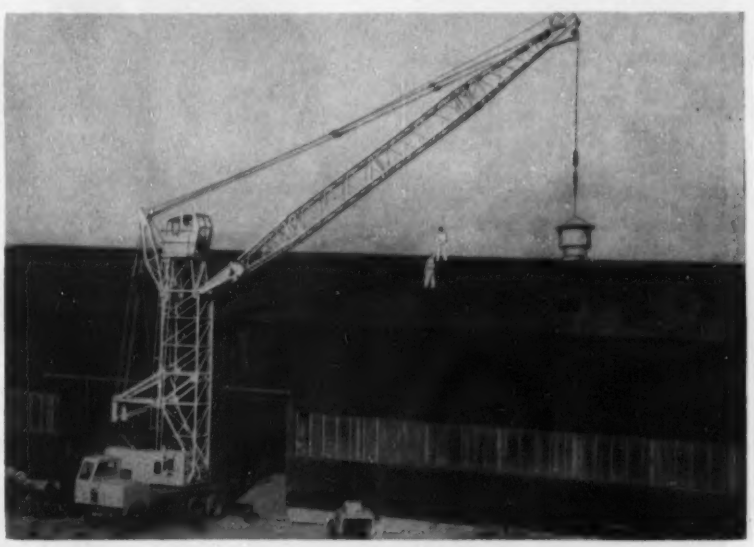
The truck carrier is available as a 6x4-drive or as a 6x6-all-wheel drive with optional power steering. A new feature is a large-capacity enclosed dunnage compartment which may be used for hooks, fall blocks and other equipment.

Travel power is channeled through a five-speed forward, one speed reverse transmisison and two-speed transfer case. The 11:00x20 tires are included as standard equipment as is the case with the telescoping rear and center outriggers.

On the crawler model, car body, circle gear and roller paths are cast integrally. Crawler drive gears are completely enclosed and run in oil. The crawler is equipped with automatic spring-loaded self-locking brakes that are disengaged by air rams when traveling. Crawler tracks feature a core-type pad 24 in. wide with self-cleaning driving sprockets.

The ¾-yd is the first new product to be added to the Michigan line since the company was acquired by Clark Equipment Co. last May. MICHIGAN POWER SHOVEL CO., 331 MILLER ST., BENTON HARBOR, MICH.

(*New Products continued on page 163*)



Tower or strut boom—it's convertible

Convertibility from tower crane to strut boom crane is the big feature of a new pneumatic-tired unit. The model shown is fitted with a 60-ft tubular boom that will lift 5 tons at 24-ft radius to a height of 82½ ft. As a normal crane it will handle a maximum of 23 tons on a 30-ft boom at 10-ft radius. The operator of the tower crane is seated a strategic 36 ft above ground level. Full circle swinging in either direction without limit is afforded. The machine is powered by individual electric motors for each motion—hoist, boom hoist and swing. The crane has been developed in England by a company associated with COLES CRANES, INC., JOLIET, ILL.

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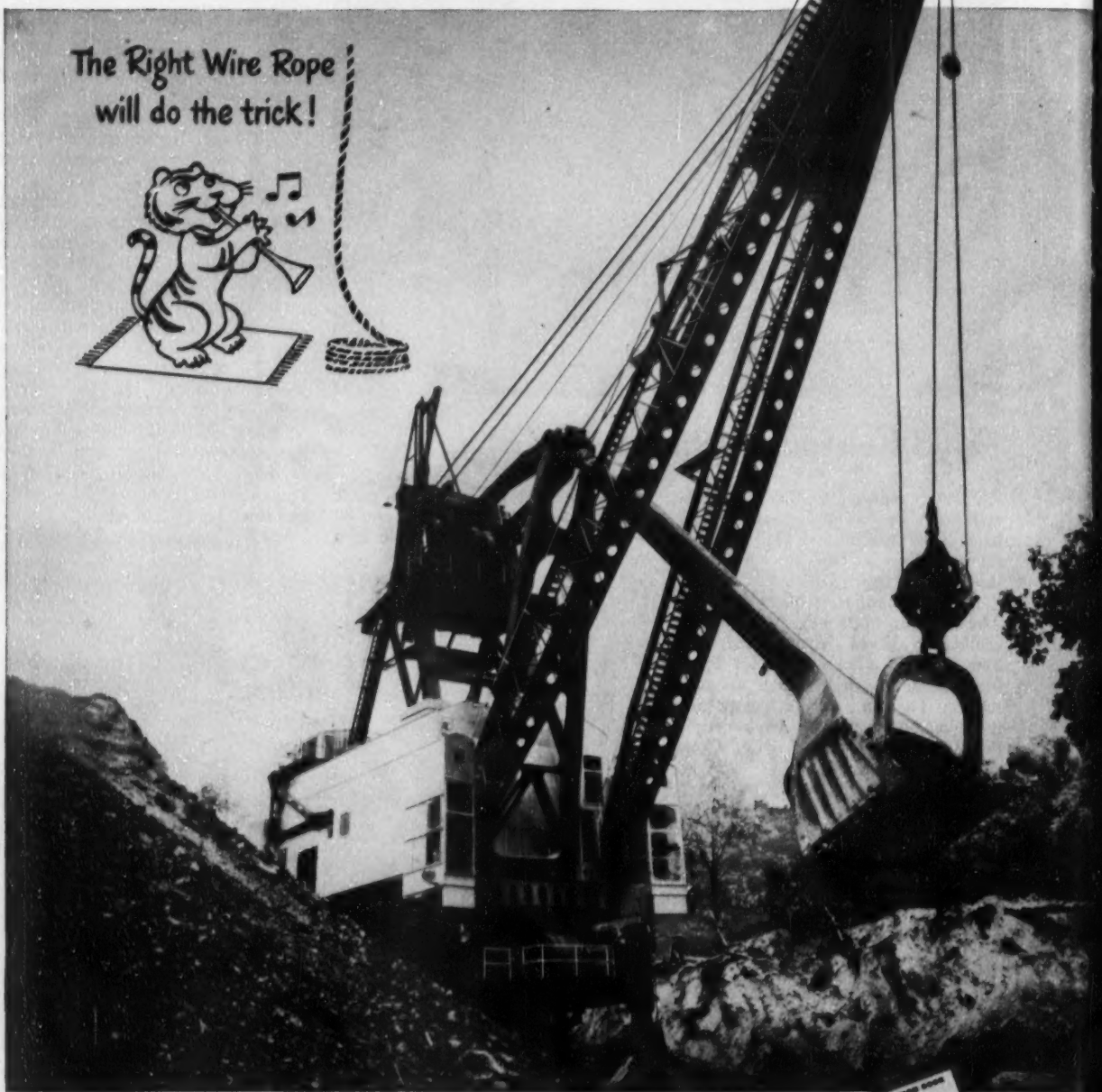

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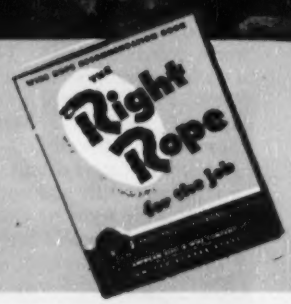

overburden moved with one Tiger Brand Hoist Rope

IMAGINE 12,587 50-ton freight cars strung out end-to-end. They would make a train more than 80 miles long; and if each car was level full, the entire train would contain 1,000,000 cubic yards of material. That's how much overburden this big coal stripping shovel moved with one American Tiger Brand Hoist Rope.

Despite hard digging, a 2⅜" Tiger Brand Wire Rope lifted and lowered the fully loaded 45 cu. yd. bucket *20,000* times before it had to be replaced. This equipment is used by Central Ohio Coal Company which supplies coal for The Ohio Power Company's new Muskingum River electric power generating plant. This company also uses Tiger Brand Wire Rope on its 18 cu. yd. shovels.

You will like Tiger Brand, too. It lasts long in *any* type of service.

Send the coupon for our recommendations of the right rope to use on your machines.

Regular lubrication of sheaves helps prevent excessive wear of the Tiger Brand Ropes on these big machines.

This 18 cu. yd. electric shovel and the 45 cu. yd. job shown on the opposite page are stripping overburden 3 shifts a day *every* day at Central Ohio Coal Co.'s big Muskingum Mine near Zanesville, Ohio. Tiger Brand Rope is giving excellent service on both these hard-working machines.

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The quotation at the top of this page is typical of impartial observers who have seen the new Barber-Greene MIXALL perform. There is widespread agreement among editors, road builders and government officials that the need for a machine capable of on-the-spot production of even the highest type hot mixes has been answered by the development of the MIXALL.

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BG

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Bucyrus-Erie beefs up its ¾-yd

Special heavy-duty equipment has been developed for the Bucyrus-Erie 22-B ¾-yd crane-excavator to widen safety factor margin and to lengthen machine life.

While basically the same machine as the standard model, the new 22-B has a long frame crawler mounting and a heavy-duty boom. The longer crawler mounting is said to provide improved traction, stability and maneuverability in action.

When equipped for lifting crane operation, the new rig carries boom lengths from 35 ft (standard) to 75 ft with removable inserts. Boom suspension is of the pendant type—lengths matching with boom inserts—with eight parts of operating line between bridle and boom point.

Available as extra equipment for booms 40 ft and longer is a 16-part suspension with pendants that provides slower boom movements for greater control.

For greater ease and safety the 22-B offers power-controlled lowering on the main hoist line. Further, hoisting and lowering of the boom is power controlled—fully independent of all other functions.

Other safety features include a friction swing brake in addition to the regular swing lock and boom stops of the telescoping pipe type.

When equipped for dragline or clamshell work, the machine carries booms ranging from 35 to 50 ft.

Shovel and backhoe front ends are not offered with this machine, but are still furnished with the standard 22-B and the 22-B Transit Crane. Bucyrus-Erie Co., South Milwaukee, Wis.

American widens use of its ¾-yd Model 375 shovel

American Hoist is now offering an alternate rope crowd for its Model 375 ¾-yd shovel. The new front features a box section type boom with large-diameter boom point sheaves and wide cast steel boom foot.

The rope crowd is designed to replace chain crowd where required. American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn.

Gar Wood's ¾-yd gets improved cab

A new, roomier, all-weather cab has been added on the Gar Wood 75 series standard and heavy-duty ¾-yd excavators and 20-ton truck cranes.

With a view to operator convenience, safety and comfort, the new cab features extruded rubber mounted windows. Of the same type of construction used in truck cabs, these new windows are said to offer complete moisture and weather protection while at the same time making replacement easier.

For hot weather operations, the window assembly folds back—eliminating the problem of storing removable windows. Further, rear and side panels can be opened to provide free cross-ventilation.

(Continued on page 166)

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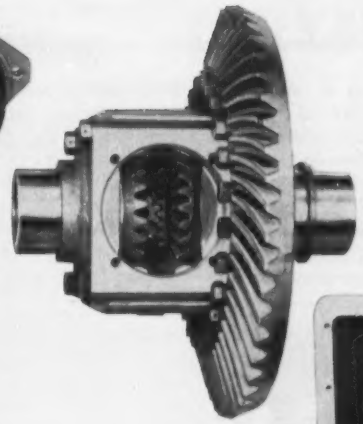
6. **Cuts down weather interruptions, lets you work a longer season**
7. **Lets operator work at top efficiency**

Have you ever noticed, when there's more than one kind of scraper rig on a job, that it's the Tournapulls which almost always are working where conditions are toughest? There's a good reason why this is true.

Unlike any other 2-wheel prime-movers, LeTourneau Tournapulls, used to pull scrapers, as well as rear and bottom-dump haulers, have automatic power-proportioning differentials. This Tournamatic differential keeps pulling-traction on both drive wheels at all times. It eliminates the problems of ordinary differentials where a spinning wheel absorbs all traction in a cutting action . . . digging into soft material until unit cannot pull out. It eliminates independent braking of drive wheels to get out of slippery spots, a practice which robs important power just when you need it most.

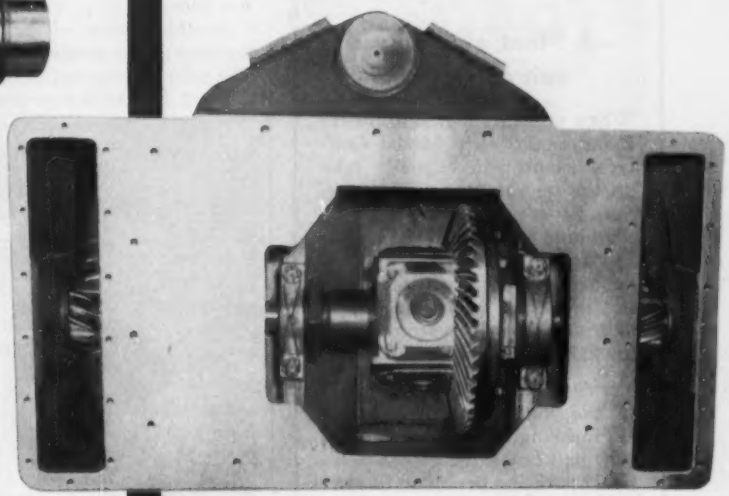
With Tournamatic differential, as soon as one wheel tends to spin, idler pinions are forced outward against friction surfaces. This automatically slows the slipping wheel, and transfers up to 4 times its tractive effort to wheel on firmer footing. Neither wheel will spin independently until the 4 to 1 ratio is exceeded.

Extra traction obtained through this equalizing of effective pull (plus the traction and flotation of big low-pressure tires) licks the toughest job conditions . . . mud,

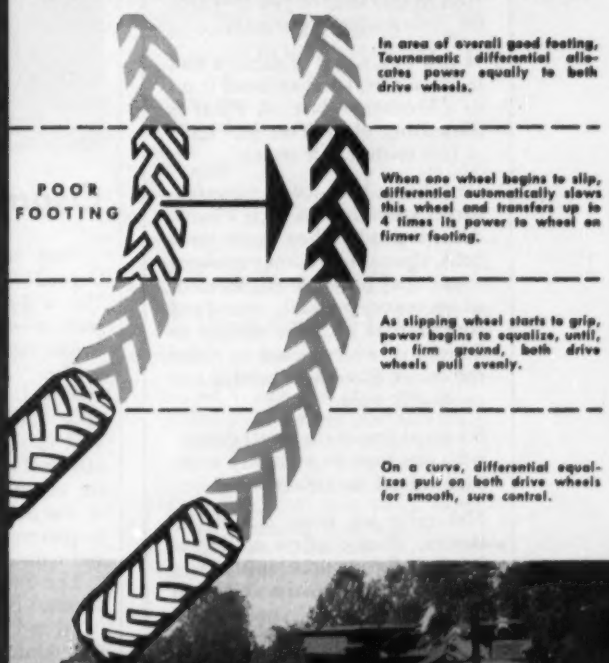


In soupy going like this, when one wheel starts to slip, extra power is allocated automatically to help other wheel pull to solid footing.

Tournamatic differential is simple in design and rugged in construction. It requires no special care or maintenance. Torque-proportioning action is completely automatic.



What the Tournamatic differential does



In area of overall good footing, Tournamatic differential allocates power equally to both drive wheels.

When one wheel begins to slip, differential automatically slows this wheel and transfers up to 4 times its power to wheel on firmer footing.

As slipping wheel starts to grip, power begins to equalize, until, on firm ground, both drive wheels pull evenly.

On a curve, differential equalizes pull on both drive wheels for smooth, sure control.

Tournamatic differential, as used on these Tournahoppers, is standard on all sizes of LeTourneau 2-wheel prime-movers. It has been job-proved on thousands of installations all over the world. It helps pull unit through soft spots, over rocks, and out of ruts.

sand, slippery materials. Helpful, too, is positive power steer, which operates independently of power train . . . lets you pivot drive wheels onto better footing. Tournamatic differential, plus these other advantages in using pulling power effectively, gets LeTourneau haulers through where other rigs bog down . . . start to work earlier in the season . . . keep working through bad weather . . . add time for profitable operations later in the year.

While the advantages of this exclusive differential are most obvious in pulling through rough, soft, slippery going, it works continuously in *any* footing to give you better traction over minor inequalities such as rocks and ruts, on curves, and throughout any haul cycle. This gives you faster, easier, more profitable hauls at all times. It also enables comparatively inexperienced operators to safely deliver high-speed production.

For more facts, see your LeTourneau Distributor. He'll be glad to show you, and let you operate a Tournamatic differential-equipped rig, so you can judge its advantages for yourself. Call today . . . there's no obligation.

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COMMENT
from the
BUTLER ENGINEER

—A Plant ain't like a suit of clothes

When you buy a Roadbuilders Plant or a Ready Mixed Concrete Plant, you virtually take on the manufacturer as a partner. So it's just good sense to look long and hard at the manufacturer's past, present and probable future. You are investing not only in bins, batchers and conveying systems, but much more in allied equipment.

Yet the Plant itself is the heart! If the manufacturer lacks in engineering, construction know-how or knowledge of the practical operating problems in *your* field, the *heart* is less efficient, less competitive, less profitable. And to that degree you jeopardize your *entire* investment.

If you buy a suit of clothes and it doesn't fit, you can hand it on to a brother-in-law. A Plant is something else. You just have to live with it. Or try to.

Less than a half dozen manufacturers specialize in such Plants. All are good. They know your field, your production problems —and they have pre-engineered, experience-proved, standard components plus the ability to "dovetail" every detail to make the entire Plant a successful and profitable unit.

So, go to one of the small group who are tops in a highly complex job of manufacturing.

Naturally we hope it will be Butler. Butler offers engineering for *all* your problems. After all, engineering is the ability to put every dollar of your investment to the most efficient and productive use. *And that's what Butler does.*

Anyway, choose an expert for an expert's job.

The Butler Engineer

BUTLER BIN COMPANY
947 WAUKESHA, WISCONSIN

The wide glass area is reported to permit complete visibility of the working area and still further vision is provided by a large window in the roll-away door.

Another feature of the new cab is the drop center design of the cab roof. The collapsible gantry folds flush with the roof for the lowest possible clearance and to prevent damage to the gantry during transport.

Roomier, the cab is said to afford complete and easy accessibility to all machinery, thereby facilitating conversion, adjustments and major maintenance. Ample work and head room is provided throughout the deck. GAR WOOD INDUSTRIES, FINDLAY, O.

Osgood-General adds new ¾-yd unit

First new model introduced by Osgood-General in 1954 is the Model 250, a ¾-cu yd crawler-mounted convertible—major design feature is rugged rigidity.

The operating machinery is mounted on a one-piece cast steel deck and the horizontal shafts are held in rigid alignment through unit-cast steel machinery side frames, which are mounted on machined pads cast in the deck. The arrangement is said to prevent weaving and misalignment and reduce wear and down time.

The swing and travel motions are actuated by spiral bevel gears operating in oil and actuated by air-cooled band-type clutches. Anti-friction bearings are used widely and lubrication is led to inaccessible points by tubing.

The machine is powered by either gasoline or diesel engines with "Continentals" standard.

The shovel boom is of all steel, welded box type construction and is 17 ft long. The 15-ft handle is of the inside type. The lattice-type boom for crane, dragline and clamshell service is all-welded with tubular lacings. Standard boom length is 35 ft with inserts of 5, 10 and 15 ft available. Two-piece jibs, 10 ft long with 5- and 10-ft inserts are also available. Pin-connected boom, which may be folded, is optional.

The hoe boom is 16½ ft long with a 6-ft 10-in. arm. Standard dippers are up to 36 in. in width.

Overall length of the crawlers is 11 ft; standard treads are 22 in. wide but 36-in. width is obtainable. Weight of machine as shovel and hoe is approximately 36,000 lb. OSGOOD-GENERAL, P. O. Box 515, MARION, OHIO.

Plaster and mortar mixer

A new plaster and mortar mixer of 2-cu ft capacity is now in production. For the larger contractor it is useful as auxiliary equipment in places inaccessible to larger mixers. Weighing only 195 lb complete, it may be carried or hoisted to any location; its price, $180 fob Metuchen, N. J. The mixer is available with either a 1.7-hp Briggs & Stratton air-cooled engine or a ½-hp electric motor, 110 volts single phase. MULLER MACHINERY CO., INC., METUCHEN, N. J.

PUBLICATIONS

Tractor shoes—A new folder describes with the aid of illustrations the features and advantages of tractor shoes manufactured by the KENSINGTON STEEL CO., DEPT. E, 505 KENSINGTON AVE., CHICAGO 28, ILL.

Water level controls—Automatic water level controls are discussed in a new catalog—a compilation of individual data sheets. Products covered include controls for elevated tanks, standpipes and reservoirs; controls for closed systems and booster systems; controls for hydro-pneumatic or pressure tanks; controls for sewage pumps; and sequence control. The book includes the complete line manufactured by the HEALY-RUFF CO., 2255 UNIVERSITY AVE., ST. PAUL 4, MINN.

Service manual—A new manual illustrates approved methods for doing many of the service operations normally encountered in servicing and repairing International farm tractors. Instructions for removing and installing gears, bearings, pulleys, shafts, precombustion cups, cylinder sleeves, injection nozzles, etc., are contained in this manual. In addition, complete tool sets, both manually and hydraulically operated for special maintenance operations, are included. Bulletin HC-53. OWATONNA TOOL CO., 370 CEDAR ST., OWATONNA, MINN.

Flush doors—This 8-pager describes the line of flush doors manufactured under the trade name Roddiscraft. Brief specifications are included as well as descriptions of the solid core flush veneer door, hollow core doors, X-ray doors, fire-resistant doors. Details of construction are also included. RODDIS PLYWOOD CORP., MARSHFIELD, WIS.

Aluminum entrances—Catalog No. 33 contains construction details of standard butt hung doors, center hung doors and special doors and entrances. Standard door frame and side light sections are also illustrated. A section contains descriptions of hardware available including panic exit devices. BRASCO MFG. CO., HARVEY (CHICAGO SUBURB), ILL.

Porcelain enamel—This 12-pager describes Davidson's architectural porcelain enamel. Besides illustrations of completed jobs the catalog contains typical construction details of interest to architects and engineers. DAVIDSON ENAMEL PRODUCTS, INC., ARCHITECTURAL DIV., DEPT. Z-53, LIMA, O.

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EDITORIALS

Cities still need planning

INDICATIONS are that the great cities of the United States are not yet ready to die—as many observers of the continuing growth of suburbs are predicting. If the results of a survey of a number of major city population migrations do nothing else, they emphasize that cities can't be killed off by suburbs (ENR Feb. 18, p. 181). Hardly to be regarded as a startling discovery, this nevertheless points to the fact that the city-planning problem is a continuing one, regardless of the development of more and bigger suburbs.

The survey seems to indicate also that much of the population of suburban areas has been drawn from two sources: New family units formed since the war, and people from other sections of the country who come to work in the city but would rather not live in it. By the same token, the cities have been replenished by older people moving in from suburban areas, and by the natural attractions of nearness to place of employment, good transportation and other municipal services.

On the one hand, therefore, it would seem that there is a limit on suburban growth, and a real need for planning in those areas to hold the population already there. At the same time the cities are by no means stagnant and must continue to be improved so that housing, utilities, transportation and other services will be adequate for the population that must live and work there. While planning in recent years has tended to focus on the problem of the suburbs, a reorientation toward the city itself is a definite prospect for the future, with better coordination of city and suburban planning set as a major objective.

New studies of educational methods

EDUCATIONAL SUBJECTS are in the news in many places these days. High spot in the national picture is the announcement that the Ford Foundation has given an additional $25 million to the Fund for the Advancement of Education to continue its studies and experimental programs. Engineering education is one of the beneficiaries of that organization's research.

More directly in the field of engineering education are two other recent developments. The first is a grant of $30,000 from the Carnegie Corporation of New York to the American Society for Engineering Education for an appraisal of the teaching of humanities and social sciences in the nation's engineering schools; and the second is appointment by the American Society of Civil Engineers of a special committee to study the adequacy of the civil engineering curricula at accredited engineering schools (ENR Feb. 25, p. 21).

This action by the ASCE Board of Direction is significant because its Committee on Engineering Education recently expressed disapproval of a proposal put forward tentatively by a Committee on Evaluation of Engineering Education set up by the American Society for Engineering Education. The latter committee proposed setting up two types of curricula in engineering schools—professional general and professional-scientific. Apparently this proposal is going to receive critical examination by the new ASCE committee—which is a healthy sign. Any proposals for major changes in teaching methods should be studied carefully, especially if they tend to increase costs at a time when many schools are operating in or close to the red.

Because of rising costs, the heads of most educational institutions are taking a critical look at the courses they are offering. James R. Killian, Jr., president of Massachusetts Institute of Technology, told the MIT Corporation that "One of the jobs ahead is to review subjects of instruction to see whether our present offering is unjustifiably large."

In like vein, Edwin S. Burdell, president of Cooper Union, in a report to the trustees, raises question as to whether colleges supported by private endowments and tuition fees are not pricing themselves out of the market by the increases in tuition rates that most of them have made in recent years.

Colleges must reduce their costs, Mr. Burdell states, "by giving more education in less time, and by instilling in every student a passionate desire for filling in the gaps in his education though post-college study. Students, with the encouragement of their parents, must look upon their college years as a foundation for a lifetime of continuing education. Future employers must evaluate their staffs not only in terms of formal education but in terms of educational effort and progress after graduation."

Much can be gained, Mr. Burdell believes, by "tightening up scholastically" the training given in high schools. He would give one type of training to students planning to go on to college and another to those who do not. Some high schools already are doing that with boys planning to go to engineering schools. The results have been so favorable as to indicate that more can be done in that direction.

The chief question raised by this proposal relates to what subjects can be shifted from college curricula to the high schools. That will require considerable study before even a preliminary answer can be found. Hence, we recommend it to the new ASCE committee and to the ASEE Committee on Evaluation of Engineering Education as a matter for study along with their studies of what is now being taught in the engineering schools themselves. Such a transfer of subjects to secondary schools may not result in any shortening of the time spent in engineering schools, such as is sought by Mr. Burdell, but it should open the way for giving a broader educational base, which is the objective of the study now being started by the American Society for Engineering Education.

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Raymond BUILDS

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THE GULF OIL CORPORATION recently used Raymond for the foundation work of a multimillion-dollar expansion program at its Toledo Refinery. In just 127 working days Raymond completed its part in the project, driving 115,000 linear feet of pipe step-taper and composite piles—another example of how Raymond efficiency saves time . . . and money.

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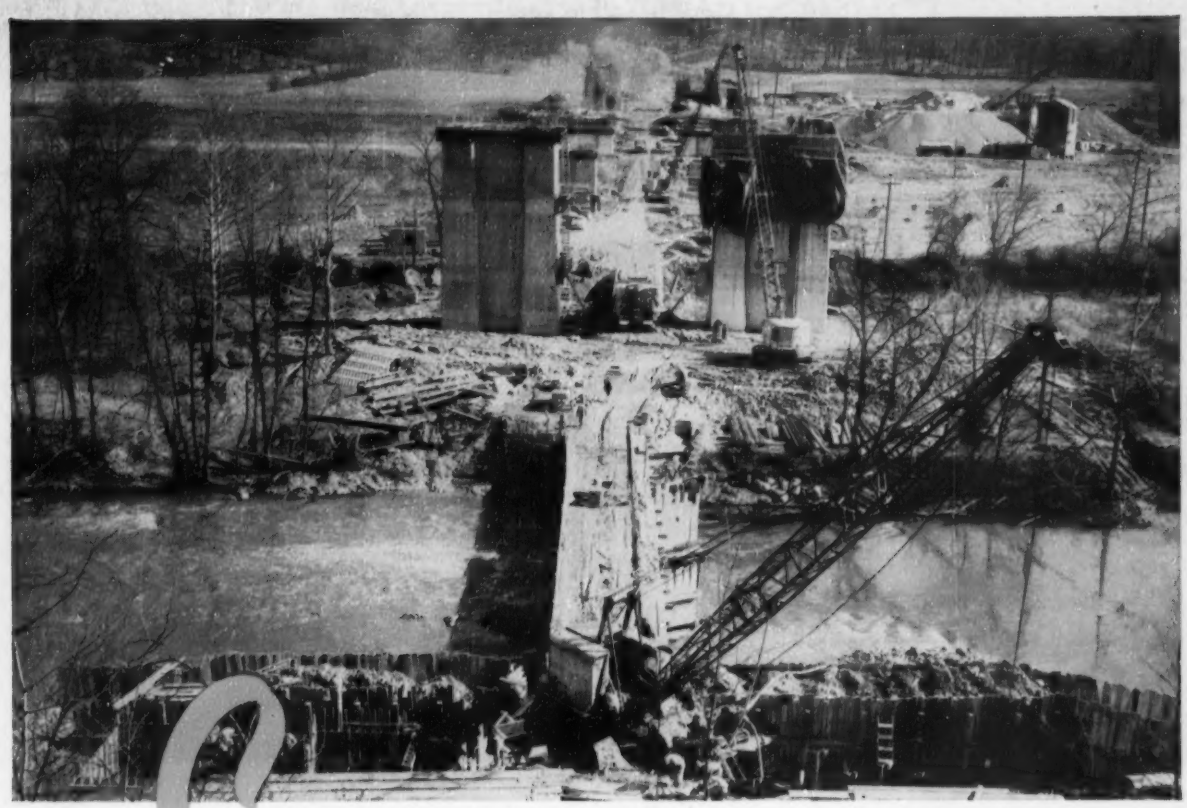

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